

Weather & Climate



Grade 5 Science Unit Plan

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Unit Overview

This unit deals with the topic of weather and climate, not only on a national basis, but also from a global perspective. The unit will begin by exploring weather folklore that exists around the world. This will engage students and peak their curiosity.

Next, the students will make their own thermometer and have the opportunity to use it and record data via observation sheets and a journal.

The remainder of the unit will focus on weather systems, such as rain, hurricanes, and thunder and lightning. Lessons will deal with specific topics of study. Finally, the unit will finish with three lessons focusing on weather phenomena. Phenomena included are natural disasters, acid rain and global warming.

Some lessons included in this unit are also cross-curricular. This includes Visual Arts, Social Studies, Math and Language Arts. The second lesson, which has the students keep a weather journal, includes graphing and tabulations. In another lesson, the students will be able to represent their local weather through a Visual Arts collage. Many lessons include Language Arts since presentations and debates are involved. Finally, a lesson that is cross-curricular with Social Studies allows students to investigate the weather technological innovations of other cultures.

Unit Plan Outcomes

Students will be expected to:

- identify and use weather-related folklore to predict weather;
- identify, construct and use instruments to measure weather information;
- record observations using instruments to describe weather in terms of temperature, wind speed, wind direction, precipitation and cloud cover;
- use appropriate terminology to name weather instruments when collecting weather data;
- compile and display weather data collected over a period of time in table and/or graph format, and identify or suggest explanations for patterns or discrepancies in the data;
- classify clouds as stratus, cumulus, cirrus, or “other”, compare results with others, and recognize results may vary;
- use a variety of sources to gather information to describe the key features of a variety of weather systems, such as rain;
- use a variety of sources to gather information to describe the key features of a variety of weather systems, such as thunder and lightning storms;
- use a variety of sources to gather information to describe the key features of a hurricane;
- identify weather-related technological innovations and products that have been developed by various cultures;
- describe situations which demonstrate air takes up space, has weight, and expands when heated;
- identify patterns in indoor and outdoor air movement.;
- provide examples of ways that weather forecasts are used by various people in their community;
- describe and predict patterns of change in local weather conditions;
- identify examples of weather phenomena that are currently being studied;
- describe how studies of the depletion of the ozone layer, global warming and the increase in acid rain have led to new inventions and stricter regulations on emissions from cars, factories, and other polluting technologies.

Lesson Plans

1. Debating Weather Folklore
2. Weather Instruments
3. Observing Weather!
4. Weather Journal
5. Cloud Watching
6. Cloud Formations
7. Rain and Raindrops
8. Thunder and Lightning
9. Understanding Hurricanes
10. Coping with Weather in Various Cultures
11. Amazing Air
12. Representing YOUR Weather
13. Weather Phenomena
14. Global and Environmental Concerns
15. An Acidic Weather Phenomenon – Acid Rain



Teacher:	Suzanne MacAulay
School/District:	St. Thomas University
Subject Area(s):	Science – Weather & Climate
Grade Level:	5
Date:	February 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Debating Weather Folklore

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- identify and use weather-related folklore to predict weather.
- *Language Arts:*
 - speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences;
 - communicate information and ideas effectively and clearly, and to respond personally and critically;
 - select, read, and view with understanding a range of literature, information, media, and visual texts;
 - interpret, select, and combine information using a variety of strategies, resources, and technologies.

Content to Be Taught: Students will learn about weather sayings and folklore that exist in their culture. Once the folklore is established, the students will then have to conduct research on the topic and construct an argument, either for or against, to be addressed during a debate. Finally, the weather folklore will be established as either true or false.

Children’s Prior Knowledge and Misconceptions: This lesson will serve as an introduction for students to the unit “Weather and Climate”. Students will most likely have some familiarity with the weather from past years, and know some weather folklore based on previous, common knowledge.

Students may misconceive that all of the weather sayings that they already know are true. They may depend on these weather sayings to predict the weather.

Performance Objective: After brainstorming some weather sayings and folklore as a whole class, the students will pair up and be assigned an item on the list, and if they are “for” or “against” it. The pairs will then have to construct an argument based on their topic to be debated with the opposing pair. Each debate will last for approximately five minutes.

Concept Development:

ENGAGEMENT (10 minutes)
<i>Materials:</i> Chart paper and markers

Procedure: As an engagement activity, the teacher will ask the students if they know any folklore that helps predict the weather in their region. The teacher can explain that folklore originates from culture and is carried through time, from generation to generation.

The teacher will write down the students' suggestions on chart paper and share a few of the following with the students (if they are not already suggested):

1. No weather is ill, if the wind is still.
2. A sunny shower won't last half an hour.
3. Clear moon, frost soon.
4. The more rain, the more rest; fair weather's not always best.
5. When sea birds fly to land there truly is a storm at hand.
6. Rainbow at noon, more rain soon.
7. Rain before seven, quit by eleven.

EXPLORATION (15 minutes)

Materials: Computers with Internet access, books for research, pencil, paper

Procedures: Once the list has been established, the teacher will then have the students pair up. Each group of 2 will be assigned one of the weather sayings (noted on the chart paper, or one at the suggestion of the teacher). Two groups of 2 will have the same weather saying; one pair is "for" the folklore, and the other is "against" it.

The groups will then have to conduct research, either on the Internet or in books provided, to build on their argument for the debate. Students will have approximately 15 minutes to conduct their research and build an appropriate argument before the debates begin. Explain to the students that they will have to present solid evidence for their topic, as well as some theoretical information, in about 2 minutes.

EXPLANATION (approximately 5 minutes per debate = total of 25 minutes for 20 students)

Materials: Whiteboard and markers

Procedures: Once the teacher has regrouped the students, the debates will begin. Each debate will last approximately 5 minutes.

The students who are "for" the weather saying will begin, followed by the group who is "against" the same weather saying. Ensure to make it clear to the other students in the classroom that they will need to listen well since there will be a vote prior to the debate to see whether they think the folklore at hand is true or false.

Once the debate has concluded, there will be a vote by the other classmates to see if they think the weather saying or folklore discussed is true or false. The teacher will keep a tally on the board, to be discussed at the end of the lesson.

ELABORATION (5 minutes)

Procedures: Once all of the debates are done, the teacher will lead a whole-class discussion on the weather folklore debated. The teacher will look at the tallies for

each debate to see if the majority of the students thought the folklore were true or false.

The teacher will ask the students why they think each of the sayings are true or false, ensuring they make a connection to different weather occurrences in the sky.

EVALUATION (5 minutes)

Materials: Paper, pencil

Procedures: To evaluate the students on the topic of weather folklore, have them complete an Exit Slip answering the following question: Choose one weather saying or folklore discussed. Say if you think it's true or false, and explain why.

Students will write out their Exit Slip and hand it in to the teacher when complete.

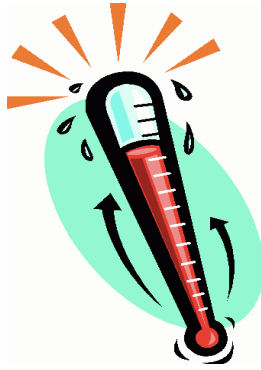
ACCOMMODATIONS

To accommodate students with reading or writing difficulties, ensure to pair them up with students who are at a higher-level in the subject area. This will enable collaboration between the students, and they can teach and help each other.

Students who need more hands-on activity to keep their focus, such as students with ADHD, may use the computer to conduct research.

If a student has speech or public speaking difficulties, he or she may write out their arguments and have their partner share the information. Another option is to split the class into two groups for the debates to reduce the amount of viewers (easier to hear, less people watching).

To enrich the lesson, allow students to instead do research on one specific weather phenomenon (i.e. frost) related to the weather folklore studied. These students may use books and the Internet to perform their research. They can present their findings to classmates via a poster another day or once the debates are done (time permitting).



Teacher:	Kayla O'Neill
School/District:	St. Thomas University
Subject Area(s):	Science: Weather & Climate
Grade Level:	5
Date:	February 29, 2012
Lesson Duration:	60 minutes

Lesson Title: Weather Instruments

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- identify, construct and use instruments to measure weather information.

Content to Be Taught: Students will learn about different weather instruments; their names and what they measure.

Children's Prior Knowledge and Misconceptions: Students will have some prior knowledge from Grade 3 and 4.

Performance Objective: After exposure to different weather measurement devices students will create a thermometer. They will use the thermometer to measure temperature.

Concept Development:

ENGAGEMENT (10 minutes)

Materials: Smartboard, Weather tools activity, small pieces of paper with each students' name, a small container

Procedure: Bring up the Weather tools activity; students will be able to interact with the Smartboard and learn about different weather tools. Have each of the student's names written on a piece of paper from a small container. Randomly draw a name when choosing students to come up to the Smartboard to ensure all students have an equal opportunity to participate. As a class, complete the quiz at the end of the Smartboard activity – choosing different students to place the answer agreed upon by the class in the correct slot.

EXPLORATION (20 minutes)

Safety: Be careful when filling the bottles with water – water spilled on the floor may cause the students to slip. Remind students not to throw any materials when working.

Materials: food coloring, clear bottles, markers, cold water, modeling clay, piece of

poster board, tape, straw, paper towel for cleaning spilled water

Procedures: Have the students at their desks (small groups of 4-5 students). Every student will be equipped with the materials required prior to class. The written instructions should be posted on the board during the activity. Orally explain the steps of the activity.

Students will fill the clear bottle with cold water until it is 3/4ths full. Add a few drops of food coloring. Place the straw in the bottle so that it is submerged in the water. Use the modeling clay to secure the straw in the bottle. Make sure the it is airtight. Tape the piece of poster board to the straw using two pieces of tape, one at the bottom and one at the top. Suck the straw gently until the water rises to approximately halfway. Use a marker to mark the water level in the straw on the poster board. Place the bottle in a warm place and the water will rise! Use a different colored marker and mark where the water has rise on the poster board. Now put the bottle in a cool area (outside or in the refrigerator). The water level will go down when the temperature gets cooler. Use a different colored marker and mark where the water level is on the poster board.

EXPLANATION 5 minutes

Include safety, materials, procedures, tips, etc.

Procedures: whole class instruction. Teacher can explain to the class how thermometers work. Teacher will inform the class that each day they can move the thermometer's they have made to see how the temperature changes (school fridge, outside, classroom, beside the heater etc.) After leaving the thermometer in a different area for a period of time the students will record with a marker the height of the water.

ELABORATION 15 minutes

Materials: paper, pencils, markers, crayons, Smartboard, netbooks.

Procedures: Students will create an illustrated glossary of terms related to the study of weather; they will include weather instruments (pictures and descriptions of their use) and words that describe weather like "humidity" and "wind-chill factor"

Each table of students will be equipped with the materials necessary to complete the task. The Smartboard will be on featuring different weather instruments and their names. Students may come to the back table that features netbooks and use them for a few minutes to research a term that describes weather.

Students will create a title page for their glossary. Students will store their glossary book in a designated area in the classroom so they can add to it throughout the unit or refer to it during another project or assignment.

EVALUATION 5 minutes

Materials: Exit Slip, pencils

Procedures: Have the kids return to their desks, and complete the exit slip. Collect exit slips and check for understanding.

ACCCOMMODATIONS

To accommodate students with reading or writing difficulties - when creating their

glossary book they may focus more on images and descriptive words vs. written definitions.

Students who have physical disabilities or fine motor skill difficulties may have help from the teacher or a peer helper at their tables when creating the thermometer. If there is an EA assigned to the classroom during this lesson the student with difficulties should be seated at the same table as the student who has an EA. If able the EA can assist both students.

To enrich this lesson students may use the netbooks to do more in depth study on a particular weather instrument.

SMARTBOARD ACTIVITY



The study of weather is called meteorology.

What do you think the scientists that study weather are called?
Hint: add **-ist**

They use instruments to measure qualities of weather.

Can you think of any qualities of weather?

Thermometers measure temperature. They tell us how hot or how cold it is.

Meteorologists have to keep track of temperature changes. They usually predict how warm it will be during the day.

What do you think they predict regarding temperatures at night?

Word	Description
<input type="text"/>	measures wind speed
<input type="text"/>	measures amount of precipitation that fell
<input type="text"/>	measures temperature
<input type="text"/>	measures humidity (moisture in the air)
<input type="text"/>	measures direction from which wind comes
<input type="text"/>	measures air pressure

Name: _____

Exit Slip

List one or two weather instruments you learned about in today's lesson.

What do these instruments measure?

What weather instrument do you think would be most useful to you? Why?



Teacher:	Kayla O'Neill
School/District:	St. Thomas University
Subject Area(s):	Science: Weather & Climate
Grade Level:	5
Date:	February 29, 2012
Lesson Duration:	60 minutes

Lesson Title: Observing Weather!

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- record observations using instruments to describe weather in terms of temperature, wind speed, wind direction, precipitation and cloud cover;
- use appropriate terminology to name weather instruments when collecting weather data.

Content to Be Taught: Students will learn that weather instruments give us important information that informs our daily life.

Children's Prior Knowledge and Misconceptions: Students will be aware (from previous lessons) of weather vanes, thermometers, barometers, anemometers and hygrometers. Students will be familiar with observation journals and making tables from previous units in Science.

Performance Objective: Students will create an observation journal. Students will record their observations and measurements in charts or tables to describe the weather and note patterns for predicting weather. Students will discover weather is changes daily.

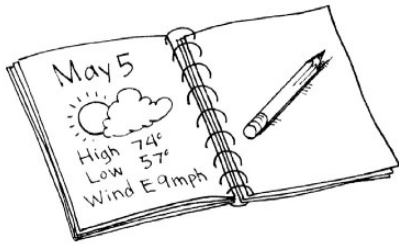
Concept Development:

ENGAGEMENT 10 Minutes
<i>Materials:</i> Smartboard, computer, www.weathernetwork.com
<i>Procedures:</i> Bring up the weather network on the Smartboard. Have a discussion with the class about what the weather for the day tells us. Some guiding questions: <i>What information is being presented? (Temperature, precipitation, humidity) Does the information presented impact our daily lives? (Yes, how to dress, do we need sunscreen, driving conditions).</i> Point out the different measurements given and discuss which weather instrument may have gathered that information.

EXPLORATION 20 minutes
<i>Materials</i> journal for each student, pencils, rulers, crayons, markers, thermometer, wind vane, netbooks (to use www.weathernetwork.com)
<i>Procedures:</i> The materials will be on each table. Students will have this time to begin their first entry. Teacher will circulate during this time to answer any questions and assist students.
EXPLANATION 10 minutes
<i>Materials</i> Sample journal, rubric
<i>Procedures:</i> Students will have access to a completed weather journal and the rubric. Teacher will assign the project – which will be due 2 weeks from that date. The students will need to include 10 entries. Time will be allotted during class to work on the journal but some work at home will be necessary. Post the necessary components of the journal in a visible space in the classroom to remind students.
ELABORATION 10 minutes
<i>Materials:</i> n/a
<i>Procedures:</i> Whole class discussion. Ask the students to report some of their findings (Temperature, wind direction, atmosphere pressure)
<i>Question:</i> What do your findings tell you about the weather?
<i>Question:</i> How do the findings impact our decisions to go outside (what to wear etc.)
<i>Question:</i> Do you think your journal entry will be exactly the same tomorrow?
<i>Question:</i> What might change? Why do you think it will change?
EVALUATION
<i>Materials:</i> Rubric, students' observations journals
<i>Procedures:</i> 2 weeks following this lesson the students will submit their journal to the teacher. They will be assessed based on the rubric (see attached).
ACCOMMODATIONS
Students who have difficulties reading or writing may take pictures of the weather they observe each day and paste them in their journal. They may use a computer to create tables or charts. Students who do not have access to this technology may draw the weather they observe and include the data.
Students may approach the teacher during recess, lunch or after school for assistance and/or guidance.

Weather Journal Instruments Rubric

Observations	4	3	2	1
Overall Weather	Very detailed descriptions of daily weather everyday.	Detailed descriptions of daily weather on most days.	Detailed descriptions of daily weather on some days.	Many descriptions missing or most lack detail.
Temperature	High and low temperature marked daily.	High and low temperature marked, but a few missing days or wrong temperatures.	High and low temperature marked, but a several missing days or wrong temperatures.	Many temperatures missing or very inaccurate.
Humidity / Dryness	Very detailed descriptions of humidity at least three times a week.	Detailed descriptions of humidity included twice.	Descriptions of humidity present but not detailed or only included once.	Descriptions of humidity missing or very inaccurate.
Precipitation	Very detailed descriptions of precipitation at least three times a week.	Detailed descriptions of precipitation at least twice a week.	Descriptions of precipitation present but not detailed or only once a week.	Descriptions of precipitation missing or very inaccurate.
Changes in Weather Over Time	Detailed reflection based on all the observations taken.	Reflection uses many observations, but missing details of one or two components.	Reflection uses many observations, but missing details of three or four components.	Reflection uses many observations, but missing details of all components.
Terminology	Each entry includes the weather instruments used to gather information and correct terminology is used	Most of the entries include instruments used and proper terminology	Weather instruments used are recorded – proper terminology was not used	Journal lacks instruments included and proper terminology.



Teacher:	Katie Dow
School/District:	St. Thomas University
Subject Area(s):	Science: Weather
Grade Level:	5
Date:	Wed., February 29, 2012
Lesson Duration:	60 minutes (& ongoing for 1-2 weeks)

Lesson Title: Weather Journal

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- compile and display weather data collected over a period of time in table and/or graph format, and identify or suggest explanations for patterns or discrepancies in the data.

Content to Be Taught:

- Weather data collection on a daily basis
- Weather predictions from day to day
- How to graph/tabulate weather data
- Seasonal Weather conditions
- Using forecasting information to make predictions

Children's Prior Knowledge and Misconceptions:

- Weather does not vary from day to day
- It's warm in the summer and cold in the winter
- There is snow on the ground in the winter
- The weather changes/does not change drastically over time

Performance Objective: In this lesson, students will have the opportunity to engage in teacher directed, and eventually their own, data-weather collection. They will learn how to draw and record important daily information in their weather journals. Students will also be expected to draw and include elements of the environment that remain constant, and change, on a daily basis. Before handing in their complete journal, students must include a graph and, or, table which shows the numerical data that they have collected.

Concept Development:

ENGAGEMENT (time: 10 minutes)

Procedure:

- Students will watch as the teacher models how to record and take notes about the weather for the current day.
- The students will offer suggestions for things to include.
- The class will begin with the teacher asking students questions about the current weather conditions; What is it doing outside right now? What is the first thing you notice when you look outside? What does the ground look like? What does the sky look like? Do you think it's hot or cold?
- As the questions are answered the teacher will model how to sketch a few things from outside (snow on the ground/trees, plants, footprints, etc.) as the students offer suggestions.
- The teacher will then ask students what they think the current temperature is outside. Some predictions should be recorded on the board.

Materials:

- Recording notebook
- Drawing materials
- Room with large window and clear view of outside
- Projector or Document camera (so students can see what you are drawing/writing)

Tips:

- Use aforementioned prompts to get students thinking about the current weather
- Ask students what is different about today's weather and that of 6 months ago
- Only record and draw what students in your class are also able to draw and record. Explain that they are not graded on art ability for this activity.

EXPLORATION (time: 30 minutes)

Materials:

- Weather recording and drawing materials
- Camera
- Plastic baggie

Procedure:

- Have students dress and prepare for outside weather.
- Take students to area outside window and ask them to look for interesting things to collect and make notes of
- Ask them to record what they see and draw some of their observations.
- Encourage them to take photos (with your assistance) and collect some small items to investigate further upon your return to the classroom (put in plastic baggie)
- Remind them to look around the whole area, up and down.
- If necessary, go to another area outside direct vicinity of school (obtain permission first and closely examine area) where there may be things other

than playground equipment and child footprints

- Give students a two minute warning
- Use cue to call students back and return to class

Safety:

- Give students a 'cue' so that they know when to return to the teacher (whistle, horn, etc.)
- Explain boundaries to students and where it is and is not safe to go. Give clear consequences for going outside these boundaries.
- Tell students what to do if they come across something they feel is dangerous or are unsure about what it is.
- If students are not properly dressed for the weather, they may not go inside and must instead, do their observations from inside.

Tips:

- Spend time with each one of the students while exploring
- Suggest they work in small groups or pairs

EXPLANATION (time: 10 minutes & ongoing)

Materials:

- Weather data for the past week
- Internet access
- Computer
- Projector/Smart Board
- Weather Websites (http://www.weatheroffice.gc.ca/canada_e.html) & (<http://www.theweathernetwork.com/>)

Procedure:

- Have students share the things they found and discovered outside (2-3 students) and examine a few things closer under document camera
- Students will have the chance to look further at the things they noticed and discovered. They will, later, be provided with opportunity to find some answers on their own. Two or three things will be explored and explained with the teacher and the whole class at this time.
- Open up weather sites and guide students (with their input and suggestions), or have one student come up, and demonstrate how to get the current weather, to add to their gathered information
- Include this information on their current entry
- Show weather data (that you have found or collected) for the past week. Demonstrate to students how to graph and tabulate the data that you have collected. Explain that this should be done with their data before their Weather Journal is collected.
- Students may also include wind direction/speed and other additional information (as they wish)

Safety:

- Ensure that the websites you use are 'student friendly'. Be weary of popups and ads they may randomly show up while using the Internet.
- Notice anything unsafe that the students might have come across or brought in the classroom. Address these issues to the whole class at this time.

Tips:

- Guide students to finding the answers on their own as much as possible. Point them in the direction where they might be able to find the answer on their own. As a last resort you may find the answer with them and work on a question together.
- Record unanswered questions or queries and research them on your own time, then discuss them next science class.

ELABORATION (time: 10 minutes & ongoing)

Materials:

- Internet access
- Computer
- Projector/Smart Board
- Weather Websites (http://www.weatheroffice.gc.ca/canada_e.html) & (<http://www.theweathernetwork.com/>)

Procedure:

- Allow students to explore other information on the weather websites (students suggest and teacher shows, or students suggest and show themselves)
- Students have this opportunity to make predictions and forecast the weather for the next day. As an elaboration, they may record the forecast for the next day on their current entry. They may use this to compare their predictions with the actual forecast. Students may use the tools (**) they have learned about to predict weather.

Tips:

- Remind students that they have to be consistent with their entries so if they choose to include an additional element they should do so every day

Safety:

- Ensure that the websites you use are 'student friendly'. Be weary of popups and ads they may randomly show up while using the Internet.

EVALUATION

- See attached Rubric (*Weather Journal: Rubric*)

ACCCOMMODATIONS

- Students may simply draw one element from the outdoor scene or use the Internet for weather pictures of the area they are monitoring.
- They may also use the computer to write with and find information. Perhaps

they will only record the temperature every other day if necessary.

Weather Journal: Rubric

Observations	4	3	2	1
Overall Weather	Very detailed descriptions of daily weather everyday.	Detailed descriptions of daily weather on most days.	Detailed descriptions of daily weather on some days.	Many descriptions missing or most lack detail.
Temperature	High and low temperature marked daily.	High and low temperature marked, but a few missing days or wrong temperatures.	High and low temperature marked, but a several missing days or wrong temperatures.	Many temperatures missing or very inaccurate.
Illustrations	Very detailed drawings of at least three items each day.	Detailed drawings of at least two items a day.	Some drawings present but not detailed or only one a day.	Drawings missing or very inaccurate.
Precipitation	Very detailed descriptions of precipitation at least three times a week.	Detailed descriptions of precipitation at least twice a week.	Descriptions of precipitation present but not detailed or only once a week.	Descriptions of precipitation missing or very inaccurate.
Changes in Weather Over Time	Detailed reflection based on all the observations taken.	Reflection uses many observations, but missing details of one or two components.	Reflection uses many observations, but missing details of three or four components.	Reflection uses many observations, but missing details of all components.
Organization	Extremely organized, with each day dated.	Mostly organized or out of order.	Somewhat organized.	Poor organizational effort.



Teacher:	Alicia Bawn
School/District:	St. Thomas University
Subject Area(s):	Science
Grade Level:	5
Date:	Feb. 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Cloud Watching

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation

Curriculum Outcomes: Students will be expected to

- classify clouds as stratus, cumulus, cirrus, or “other”, compare results with others, and recognize results may vary

Content to Be Taught:

Students will be able to identify different types of clouds by observation and classify them.

Children’s Prior Knowledge and Misconceptions:

- Students will have knowledge that clouds are in the sky, that they look different depending on the day
- Students may think that all clouds are the same and are simply called clouds

Performance Objective:

- Students will go outside to observe and record what they see notice about the clouds. Back in the classroom students will determine what type of cloud they saw. Students will research a different type of cloud and put together a poster and short presentation to teach the rest of the class about other types of clouds.

Concept Development:

ENGAGEMENT (10 minutes)

-Have you ever spent time looking up at the clouds in the sky? What did you see? Describe the clouds.

-Look at website with students before moving to the next activity:

http://www.windows2universe.org/earth/Atmosphere/clouds/cloud_types.html

-Students will be able to gather more knowledge about cloud types. Ask students to describe some of the cloud types seen on the website.

EXPLORATION (15 minutes)

-Students will be put in groups of 3 or 4.

-They will go outside and observe at the clouds. (If clouds are not visible, look at a video online on the smart board)

-Students will draw the clouds they see in the sky. (*See Attachment)

***Safety:** Students will be expected to wear appropriate attire for the weather.

EXPLANATION (5 minutes)

-Students will come back in to the classroom and revisit the website that is presented on the Smart Board to determine what kind of clouds they saw outside (or online if weather is not cooperating)

ELABORATION (15 minutes)

Make a cloud poster

-Students will then, in their same small groups, select a type of cloud from the variety of cloud types to further learn about.

-The teacher will provide packets of information on different cloud types for students to choose from.

Materials:

- bristol board
- markers
- glue
- scissors
- information packet

-Students will need to create a small poster on their cloud type to present to the class, including a title, drawings and information.

EVALUATION (15 minutes)

-Students will hand in their sheets and sketches for evaluation

-Students will present their poster to the class, giving some information on their cloud type.

-Teacher will walk around to check for understanding and participation during the activities

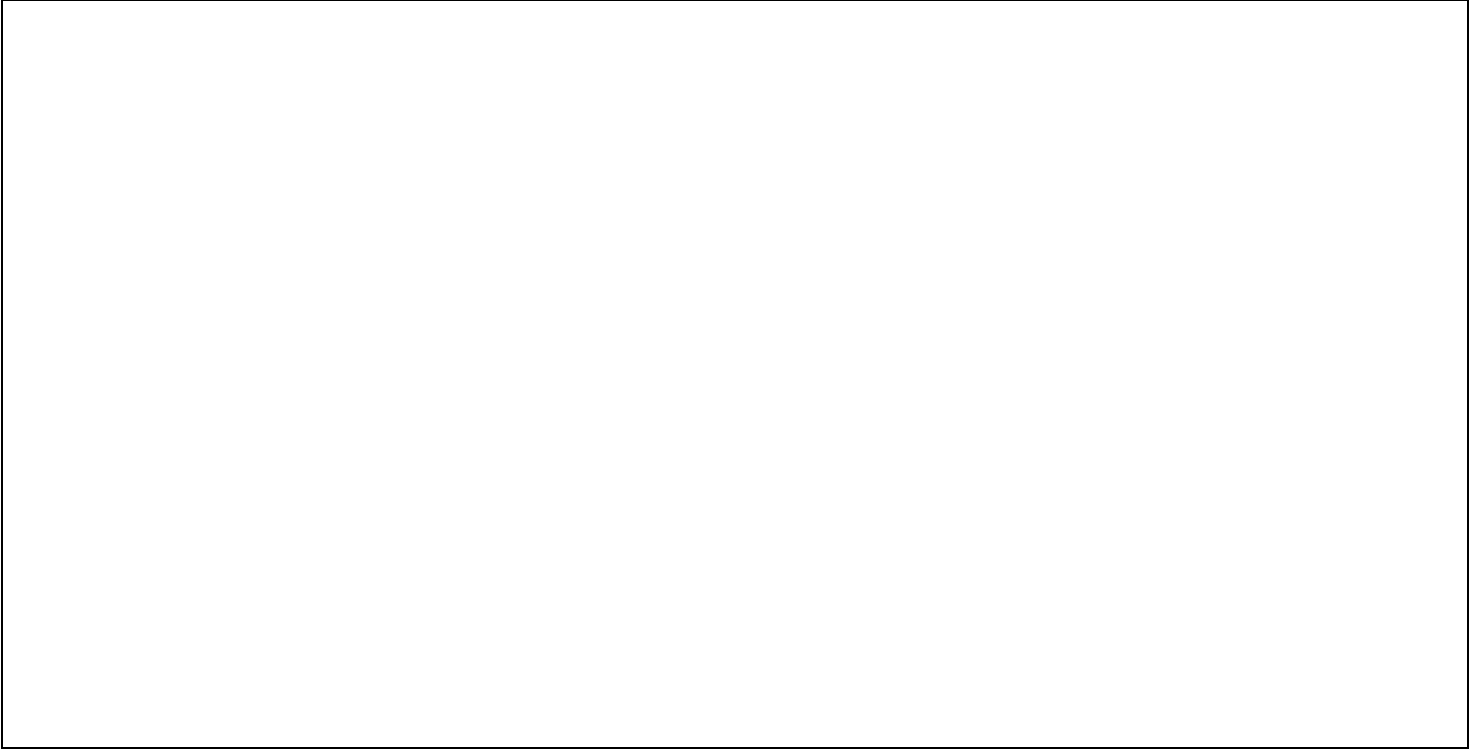
ACCOMMODATIONS

-If needed, students can watch videos on the computer of a sky with clouds, draw and make their predictions without going outside

-Students can create a poster alone, or on the computer to show their understanding.

**Draw & write what you observed
about the clouds**

Draw what the clouds look like:



Describe in a few sentences what the clouds look like.

TYPE OF CLOUD:

Rubric: Presentation of Poster

	Got it!	Almost there	Not yet
Elements on poster (Title, information and pictures)			
Creativity (Students out thought and creative elements into their poster)			
Presentation (Students will give some information about their cloud type, and explain the characteristics of the cloud type)			



Teacher:	Alicia Bawn
School/District:	St. Thomas University
Subject Area(s):	Science
Grade Level:	5
Date:	Feb. 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Clouds Formations

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation

Curriculum Outcomes: Students will be expected to

- classify clouds as stratus, cumulus, cirrus, or “other”, compare results with others, and recognize results may vary.

Content to Be Taught: Students will be able to understand the components that are used to form clouds.

Children’s Prior Knowledge and Misconceptions: Students will have knowledge or misconceptions based on that clouds just appear in the sky and are not formed from many elements.

Performance Objective: Students will perform an experiment in order to comprehend how clouds are formed. Students will also complete an observation sheet before, during and after the experiment.

Concept Development:

ENGAGEMENT	
-Question: What elements do you think are needed to form clouds?	
-Watch video about how clouds form http://www.sciencekids.co.nz/videos/weather/clouds.html	
EXPLORATION	
-Experiment: (In groups of 3)	
CLOUD IN A BOTTLE	
MATERIALS: 2-liter clear plastic pop bottle matches (children will need adult assistance to light matches) warm water	

PROCESS:

Fill the clear plastic 2-liter bottle one-third full of warm water and place the cap on. As warm water evaporates, it adds water vapor to the air inside the bottle. This is the first ingredient to make a cloud.

Squeeze and release the bottle and observe what happens. You'll notice that nothing happens. Why? The squeeze represents the warming that occurs in the atmosphere. The release represents the cooling that occurs in the atmosphere. If the inside of the bottle becomes cover with condensation or water droplets, just shake the bottle to get rid of them. Take the cap off the bottle. Carefully light a match and hold the match near the opening of the bottle.

Then drop the match in the bottle and quickly put on the cap, trapping the smoke inside. Dust, smoke or other particles in the air is the second ingredient to make a cloud.

Once again, slowly squeeze the bottle hard and release. What happens? A cloud appears when you release and disappears when you squeeze. The third ingredient in clouds is a drop in air pressure.

EXPLANATION:

Water vapor, water in its invisible gaseous state, can be made to condense into the form of small cloud droplets. By adding particles such as the smoke enhances the process of water condensation and by squeezing the bottle causes the air pressure to drop. This creates a cloud!

Safety: Students will step back away from the bottle and the match as the teacher lights and places the match in the bottle.

EXPLANATION

-Complete Science Observation Sheet
*See Attachment

ELABORATION

-Come back together as a class and discuss what some of the predictions were, observations and conclusions were based on the experiment.
-Teacher will also go through steps about how each element needed to form clouds was present in the experiment.

EVALUATION

-Students will hand in their observation sheets for marks based on completion and details.

ACCOMMODATIONS

-Flexible grouping will be provided
-Students can complete the experiment and observation sheet by watching a video on how the experiment works if they are unable to complete the experiment themselves. -
<http://youtu.be/E8AvfXar9zs>

Observation Sheet:

Clouds



Hypothesis:

What do you predict will happen if you squeeze the pop bottle after putting the warm water in it and sealing it?

What do you predict will happen when the teacher drops the match in the bottle of water?

What do you predict will happen when you squeeze the bottle after the match has been dropped in?

Observations:

	Observations
Squeeze bottle of water	
Drop the match	
Squeeze the bottle with match	

Conclusions: Were your predictions correct? Explain.

Squeeze bottle of water:

Drop match:

Squeeze bottle with match:



Teacher:	Alicia Bawn
School/District:	St. Thomas University
Subject Area(s):	Science
Grade Level:	5
Date:	Feb. 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Rain and Raindrops

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- use a variety of sources to gather information to describe the key features of a variety of weather systems, such as rain.

Content to Be Taught: In this lesson, students will learn about how rain is formed. They will also learn that not all raindrops are the same size before they fall and when they land.

Children’s Prior Knowledge and Misconceptions: Most students will have experienced a rainy day. Students may think that raindrops are all the same size and shape.

Performance Objective: Students will be participating in 2 experiments to learn about how rain is formed as well as exploring how raindrops are all different sizes and change size when they land.

Concept Development:

<p>ENGAGEMENT (10 minutes)</p> <p>-How big do you think a raindrop is?</p> <p align="center">How big are raindrops?</p> <p>Raindrops are much smaller than we think! They are actually smaller than a centimeter. Raindrops range from 1/100 inch (.0254 centimeter) to 1/4 inch (.635 centimeter) in diameter.</p> <p align="center">How does rain form?</p> <p>Water droplets form from warm air. As the warm air rises in the sky it cools. Water vapor (invisible water in the air) always exists in our air. Warm air holds quite a bit of water. For example, in the summer it is usually very humid. When enough of these droplets collect together, we see them as clouds. If the clouds are big enough and have enough water droplets, the droplets bang together and form even bigger drops. When the drops get heavy, they fall because of gravity, and you see and feel rain</p>

<http://www.weatherwizkids.com/weather-rain.htm>

EXPLORATION (20 minutes)

*Safety: Students should be careful around the hot water, as it may splash while being poured into the jar.

Making Rain

MATERIALS:

- glass mayonnaise or canning jar
- plate
- hot water
- ice cubes
- index cards

PROCESS:

Pour about two inches of very hot water into the glass jar.

Cover the jar with the plate and wait a few minutes before you start the next step.

Put the ice cubes on the plate.

What happens? The cold plate causes the moisture in the warm air, which is inside the jar to condense and form water droplets. This is the same thing that happens in the atmosphere. Warm, moist air rises and meets colder air high in the atmosphere. The water vapor condenses and forms precipitation that falls to the ground.

*Students who get done early can measure the droplets to see if they are accurate to the size of a real raindrop.

<http://www.weatherwizkids.com/experiments-make-rain.htm>

EXPLANATION (10 minutes)

-Students will complete the before, during and after sections of the Observation sheet on Rain and Raindrops

*See Attachments

ELABORATION (15 minutes)

Experiment: Rain Drops

-Now that students have discovered how rain forms, they are going to make raindrops and measure them. This will allow students to understand that each raindrop that falls is not the same.

-Each group from the previous experiment will get an eye dropper, a glass of water, a clear dish and a ruler. Students will fill the eye dropper with water, they will then hold the eye dropper 12 in. above the plate (by measuring with the ruler) and drop a drop of water. They will then measure the diameter of the raindrop and record. Clean off clear dish and repeat for 2 more raindrops.

EVALUATION (5 minutes)

-Students will hand in their observation sheets for both experiments to be marked based on

completion, and details of experiment recorded.

ACCOMMODATIONS

- Students can watch video on how to complete these experiments and complete the observation sheet
- Students who have reading and writing difficulties may pair up with a peer helper when reading and completing the observation sheet.

Observation Sheet for Experiment 1:
Make It Rain



Hypothesis:

What do you predict will happen when you place the ice cube on the plate?

Observations:

Describe your observations in words and pictures.

Conclusions: Was your prediction correct? Explain.

Ice Cube:

Observation Sheet for Experiment 2:
Rain Drops



Hypothesis:

What do you predict will happen to the raindrop when it hits the plate?

How big do you predict the raindrops will be?

Observations:

	Drop 1	Drop 2	Drop 3
Measurement of each raindrop			

Conclusions: Were your predictions correct? Explain.

Raindrops hit plate:

Size:



Teacher:	Alicia Bawn and Kayla O’Neill
School/District:	St. Thomas University
Subject Area(s):	Science
Grade Level:	5
Date:	Feb. 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Thunder and Lightning

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- use a variety of sources to gather information to describe the key features of a variety of weather systems, such as thunder and lightning storms.

Content to Be Taught: Students will be expected to identify the major aspects of thunder and lightning.

Children’s Prior Knowledge and Misconceptions: Most students will have experienced a thunder and lightning storm. Students may not realize thunder and lightning are two separate phenomena’s.

Performance Objective: Students will use the learning center to learn about thunder and lightning, how it is created, how it looks and sounds.

Concept Development:

ENGAGEMENT (10 minutes)
-Question: Have you heard thunder and seen lightning before? What did you see or hear?
-Show videos:
Video 1: http://www.sciencekids.co.nz/videos/weather/slowmotionlightning.html
- slow motion lightning
Video 2: http://www.sciencekids.co.nz/videos/weather/lightningstrike.html
- big crack lightning strike
EXPLORATION (25 minutes)
Materials:
• Balloons for every group of 3-4 students

- Energy saving light bulb for each group
- Combs for every group
- Ball of wool (piece for every 3-4 students student)
- Access to a metal doorknob

-Experiment 1:

(What Causes Thunder?):

- Blow up the balloon so it is somewhat tight and can be tied.
- Rub balloon on hair for several seconds (about 15).
- Hold the balloon near the end of the light bulb.
- What happens? Discuss with your partner or others.
- Put a hand on each side of the balloon (tied end facing up).
- Push your hands toward each other until the balloon pops.
- What happened (to the air in the balloon)? Discuss.

-Experiment 2:

Lightning

- Take a comb and rub it with a piece of wool for 10 seconds.
- Hold the comb near a metal doorknob.
- What did you see/hear/feel? Why do you think this happened? Discuss with your partner or others.

EXPLANATION (10 minutes)

-Students will complete the before, during and after sections of the Observation sheet on Thunder and Lightning
*See Attachment

ELABORATION (10 minutes)

-Come back together as a class and discuss what some of the predictions were, observations and conclusions were based on the experiment.

EVALUATION (5 minutes)

-Students will hand in their observation sheets to be marked based on completion, and details of experiment recorded.

ACCCOMMODATIONS

-Students can watch video on how to complete these experiments and complete the observation sheet
-Students who have reading and writing difficulties may pair up with a peer helper when reading and completing the obseration sheet.

Observation Sheet:

Thunder & Lightning



Hypothesis:

What do you predict will happen when you hold the balloon near the end of the light bulb?

What do you predict will happen when you touch the comb to the doorknob?

Observations:

	Test 1	Test 2
Balloon		
Comb		

Conclusions: Were your predictions correct? Explain.

Balloon:

Comb:



Teacher:	Suzanne MacAulay
School/District:	St. Thomas University
Subject Area(s):	Science – Weather & Climate
Grade Level:	5
Date:	February 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Understanding Hurricanes

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will expected to

- use a variety of sources to gather information to describe the key features of a hurricane;
- identify weather-related technological innovations and products that have been developed by various cultures in response to hurricanes.
- **Language Arts:**
 - communicate information and ideas effectively and clearly, and to respond personally and critically;
 - select, read, and view with understanding a range of literature, information, media, and visual texts;
 - interpret, select, and combine information using a variety of strategies, resources, and technologies.

Content to Be Taught: In this lesson, students will learn more about hurricanes. They will learn to seek out sources to find more information on a given topic, and then they will present their findings to classmates via a discussion. The lesson will end with some information about hurricane safety and how the students can protect themselves during this type of weather system.

Children’s Prior Knowledge and Misconceptions: Students will already have studied some wind characteristics and may have prior knowledge on other common weather systems. Since this lesson will only focus on hurricanes, the students will be able to learn about the topic in depth. This lesson will also help further their research skills. A misconception is that students may believe that hurricanes do not differ in wind force and speed.

Performance Objective: After a quick hands-on activity to help the students feel the basic motion of a hurricane, the students will begin to explore a pre-determined field of research on the topic that they will then be able to discuss and explain to their classmates. After

extending their knowledge on the weather system at hand, the students will then be led into a discussion about hurricane safety and what they can do to stay safe.

Concept Development:

ENGAGEMENT (8 minutes)
<i>Materials:</i> Four 30-inch pieces of string, four soft toys (for 4 stations around the classroom)
<i>Safety:</i> Ensure that students stand at a far enough distance from the student who is swinging the toy so they do not get hit. Tell children that they need to stand at least 3 arm-lengths away from the student doing the experiment. Ensure to use small, soft toys so the students' safety is not at a great risk if they happen to come in contact with it. Also, the teacher will make sure to tie the toys to the strings before class to ensure that they are tied on tightly.
<i>Procedure:</i> As an engagement activity, the students will do a hands-on experiment to understand the basic motion of a hurricane. First, the teacher will have to split up the students into 4 groups, each at different corners of the classroom. Next, the teacher will pass out a piece of string, with the soft toy already attached to it, to each group. The teacher will have to prepare this before class begins. Each group will then take their turn to swing the string with the toy around in a circle above their head. Each member of the group should have their turn. Make sure to go over the safety rules with the students before they begin the experiment. As students are finishing up the activity, the teacher may lead a quick whole-class discussion about how the toy moved as they swung around the string. It is important that students notice that the toy felt as if it was pulling away from them as they increased the speed. This feeling compares to the movement of a hurricane since the wind is constantly moving away from the eye of the hurricane, which is the center where no wind is present.
EXPLORATION (20 minutes)
<i>Materials:</i> Computers with Internet access (preferably one computer per two students, i.e. a computer lab), paper, pencil
<i>Procedures:</i> Once the discussion has ended and the materials from the hands-on experiments are put away, the teacher will ask the students to regroup in their experimental groups. Once all of the groups are settled and sitting together, the teacher will then assign each of them one of the following research questions: <ol style="list-style-type: none">1) What is a hurricane and what are its different parts?2) How do hurricanes form?3) Hurricane Scale4) The stages of a hurricane5) The naming of hurricanes

Explain to them that they will need to research the topic assigned and form a list of important points that they would like to share with the class. They will need to choose a group leader who will present their findings. The students can use the following websites to guide their research:

- a) <http://kids.earth.nasa.gov/archive/hurricane/creation.html>
- b) <http://www.weatherwizkids.com/weather-hurricane.htm>
- c) <http://skydiary.com/kids/hurricanes.html>
- d) <http://theweatherchannelkids.com/cool-clips/> (video included)
- e) <http://www.kidzworld.com/article/5949-all-about-hurricanes>

EXPLANATION (approximately 2 minutes per group = total of 15 minutes for 20 students)

Procedures: After the groups have finished researching their assigned topic, the students will then gather as a whole class, and each group leader will take their turn presenting their group's findings to the class (ensure to follow the order of the list above to have an effective sequence).

The teacher may add comments and provide further information on the students' findings if need be. Allow students to ask questions after each leader's presentation.

ELABORATION (15 minutes)

Materials: Smart Board or projector, Internet access, website on hurricane safety tips for kids - http://www.ehow.com/facts_5215192_hurricane-safety-kids.html

Procedures: Once the group leaders have presented their findings and the teacher has addressed all questions, the teacher will then proceed to talk about hurricane safety with the students.

To begin, the teacher will talk to the students about their previous knowledge and experiences with hurricanes. Students may mention different hurricanes in history that they remember. Ensure to encourage discussion about how the hurricanes affected people, their houses and the land.

Next, the teacher will show the students the website link above about how to stay safe in the event of a hurricane. The students and teacher will read through the tips together and elaborate on them. Allow students to suggest other ways to stay safe. An example that the teacher may want to present to the students is hurricane shutters that cover and protect windows on a house. This technological innovation is key in regions where hurricanes are common.

EVALUATION (2 minutes for explanation)

Materials: Newspapers, paper, pencil (done at home)

Procedures: Once the lesson has finished, ask students to find a newspaper article (either in a current newspaper or found online) at home that evening that touches on a specific hurricane that has affected our world, past or present. After they have read the article, they will need to answer the following question, in two to three sentences, and hand it in to the teacher the next day:

How did the hurricane affect the people? The land? Answer this in 2 to 3 sentences.

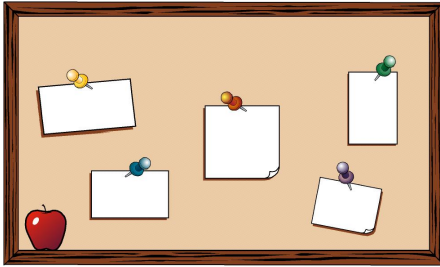
The next day, the teacher will collect their answers to the question, read over them and make sure that the students understand the main effects of a hurricane. Any confusion about hurricanes should be reviewed with the students before the next Science lesson.

ACCOMMODATIONS

For the hands-on activity at the beginning of the lesson, those students with motor difficulties may work with another student or EA to swing the string around together.

To accommodate students with reading or writing difficulties, ensure to pair them up with students who are at a higher-level in the subject area. This will enable collaboration between the students, and they can teach and help each other.

If a student has speech or public speaking difficulties, this lesson allows them to fully participate since another group member can be the group leader. In addition, the evaluation part of the lesson is done at-home so parental support may be used if needed.



Teacher:	Kayla O'Neill
School/District:	St. Thomas University
Subject Area(s):	Science: Weather & Climate
Grade Level:	5
Date:	February 29, 2012
Lesson Duration:	60 minutes

Lesson Title: Coping with Weather in Various Cultures

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand the weather changes from day to day and over the seasons and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- identify weather-related technological innovations and products that have been developed by various cultures in response to weather conditions
- **Social Studies:** identify similarities and differences in the ways cultures meet human needs and wants.
Explain why human cultures meet human needs and wants in diverse ways.

Content to Be Taught: Students will learn about weather-related innovations developed by different cultures to cope with weather conditions. Students will compare and contrast these innovations.

Children's Prior Knowledge and Misconceptions: Students will be aware of different cultures and that they often have different traditions. A common misconception would be that all cultures use (example) an umbrella and rain jacket when it rains.

Performance Objective: Students will create a bulletin board to display products that have been developed by various cultures to help them cope with extreme weather.

Concept Development:

ENGAGEMENT 10 minutes
<i>Materials</i> computer, Smartboard, speakers, youtube videos Tornadoes in Mississippi - http://www.youtube.com/watch?v=Ev2bZRV8eOo Yukon Weather - http://www.youtube.com/watch?v=esOa-w53e8o&feature=related Rainstorms - http://www.youtube.com/watch?v=K0TXxZNTPIQ
<i>Procedures</i> Show the kids some videos of weather storms get them thinking about weather conditions and how people might cope with them.
EXPLORATION 30 minutes
<i>Safety</i> Ensure students are careful and responsible when using the scissors

Materials bulletin boards, scissors, glue, tape, markers, construction paper, pastels, white paper, netbooks, National Geographic, magazines

Procedures Students will work in small groups (3-4). They will collaboratively create a poster depicting different weather related technological innovations that cultures have developed in response to weather conditions (example: igloos, hurricane shutters, umbrellas...) Students may compare and contrast items used. Students should label the innovations and identify which culture or geographical area uses the item (wherever possible). Students can cut pictures out of National Geographic and magazines to put on the poster or draw items they find online. Students are to attach the images on the bulletin board. Ensure students are aware they are to include their names and a title on their board.

EXPLANATION/ELABORATION 15 minutes (6 groups ~ 2 minutes each)

Materials: completed bulletin boards

Procedures Students will present their posters and findings to the class. They may elaborate on an item that was particularly interesting to them or highlight a similarity or difference they found.

EVALUATION 5 minutes

Materials Exit Slip, Rubric

Procedures: Students will complete a brief exit slip (see attached). They will elaborate on what they have learned through the assignment. Collect the bulletin boards and assess them based on the rubric attached). Display posters around the classroom.

ACCOMMODATIONS

Students with speech difficulties can have a peer in their group do the brief presentation.

Students who have fine motor difficulties can have a peer helper in their group to assist – or this student can read the information from the magazines while other members cut, glue write.

Students who have difficulty reading and writing may take on the roll of cutting or gluing or drawing the images.

Bulletin Board Rubric

	3	2	1
Project included weather related technological innovations			
Project included tools from different cultures/geographical regions			
Some items were labeled and included where they were found			

EXIT SLIP

Name: _____

List one weather-related technological innovation you discovered during this assignment.

What did you like or dislike about this innovation?

Why do you think this would be an effective or ineffective tool to cope with weather conditions?



Teacher:	Katie Dow
School/District:	St. Thomas University
Subject Area(s):	Science: Weather Unit
Grade Level:	5
Date:	Wed., February 29, 2012
Lesson Duration:	60 minutes

Lesson Title: Amazing Air

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- describe situations which demonstrate air takes up space, has weight, and expands when heated;
- identify patterns in indoor and outdoor air movement.

Content to Be Taught: Students will see the physical properties of air and have experience with them. They will have the opportunity to do demonstrations and experiments with the properties of air.

Children’s Prior Knowledge and Misconceptions:

- Air is invisible and weightless
- Air always stays the same
- Air is everywhere
- Air is always the same temperature, and doesn’t shrink or expand

Performance Objective: Students will have the opportunity to learn about, and engage in a variety of discrepant events and open-ended experiments in order to gain an understanding of air and the properties of air. Students will be able to explain that air takes up space, has weight, and expands when heated. They will also be able to explain how things (like humans and a variety of items) interact with air.

Concept Development:

ENGAGEMENT (time: 15 minutes)

Materials:

- 2 helium foil balloons (one purchased a few days prior to the class and the other purchase the day of)
- Hairdryer (with outlet near by)
- Other various items like tire pump, lamp, spoon, butter knife, etc.

Procedure:

- Begin the class by asking students what is air. Ask them to, in their science journals, list all of the things they can think of, or see in the room, that are full of air. Ask students if they have ever felt the force or pressure of air. Discuss their experiences
- Begin discrepant event 1: A few days prior to this class buy one helium foil balloon and then buy one the day of the class. Bring both balloons to class and explain that you have a situation on your hands.
- Tell the class that you are having a birthday party this evening and that you need to figure out a way to make both balloons the same full size again. Take 4-5 suggestions from the class.
- Without telling the students what to do, guide their questions and suggestions to thinking about a way to heat the deflated balloon. Try a few of their suggestions, finally deciding to use the hairdryer to reheat the balloon and inflate it (by heating the air inside). This works because air, when heated, expands. Do not directly give this answer to the class but instead have a discussion about why this works.

Safety:

- If students are going to use the hairdryer, take proper precautions and give them instructions about how to operate it.
- Be wary if the balloon busts or gets too hot
- Keep students at a safe distance from the discrepant event

Tips:

- If the experiment doesn't work with the helium balloons then fill two normal balloons, similarly (it should work the same).
- Do not give students the answers to the questions. If they are not sure about why the discrepant event worked then leave them curious, it will keep them wondering and engaged for the rest of the lesson.

EXPLORATION (time: 30 minutes)

Materials:

- Observation sheet (see attached)
- Several plastic bottles of varying sizes
- Several jars of varying sizes
- Large plastic bin
- Water
- Towels and paper towel
- Large rotating fan
- Desk fan
- Plastic bags of varying sizes
- Small (dollar store) windmills
- Scraps of paper
- Several potatoes

- Several apples
- 1 box of firm plastic straws

Procedure:

- Set up 4 experimental stations where students will be required to record their predictions, observations, and results.
- Students will be placed in groups of approx. 5 students each
- They will be given a station number to begin with and rotate stations every 5-7 minutes
- **Station 1:** At this station there will be several bottles and jars of varying sizes. There will also be a large tub $\frac{3}{4}$ full with water, towels, and paper towel. **Student instructions:** Put the bottle or jar in the water. Predict what will happen before starting. What is happening? Why do you think this is happening? Try putting the jar/bottle in different ways. What is different each time? What happened in the end/what conclusions can you draw?
- **Station 2:** At this station there will be a large standing/rotating fan and a small desk size fan. There will also be a variety of plastic bags and small windmills. **Student instructions:** Turn the fans on at a variety of speeds. Predict what will happen when you hold the plastic bags near the fans, before starting. What is happening? Why do you think this is happening? Try using different size bags with different fan speeds. What happened in the end/what conclusions can you draw?
- **Station 3:** At this station there will be several plastic bottles of varying sizes. There will also be several strips and scraps of paper. **Student instructions:** Take one bottle and one strip/scraps of paper. Find a table and your own space. Roll up your piece of paper onto the size of a pea. Predict what you think will happen when you blow hard and fast into the bottle? What happens? Why do you think this happened? Try using different size bottles and blowing at different forces and speeds. What happened in the end/what conclusions can you draw?
- **Station 4:** At this station there will be a box of still plastic straws and several potatoes and apples. **Student instructions:** Before trying to stab the potato with the straw predict what will happen. What happens when you try it the first time? Why do you think this happened? What happens if you hold the straw a different way or hold your thumb/finger over one end of the straw? What happened in the end/what conclusions can you draw?

Safety:

- There are a variety of safety concerns to consider when doing these centres.
- Ensure that students are not dropping and breaking glass (if so clean up right away)
- Remind students to wipe of their hands and arms if they get wet

- Explain to students how to use fans and that you should not put your fingers into the fan. Tell students to NOT put the plastic bags in the fan
- Tell students not to hit others with any materials and to take their fair turns
- Explain that they are to take proper precaution when “stabbing” the potato (if possible have an EA, or class volunteer monitor this centre)
- Explain that if they cannot complete the activity safely and cooperatively, then they will no longer be able to participate.

Tips:

- Go over the rules and procedure for each center prior to beginning
- Remind students about recording scientifically
- Encourage them to work collaboratively
- Walk around and monitor centers as well as offer suggestions and advice.

EXPLANATION (15 minutes)

Materials:

- Smart Board/White Board
- Students with observation sheets

Procedure:

- Have students assist with returning materials and tidying up classroom
- Ask students to complete their sheets and return to their seats or the designated meeting area.
- Start discussion about air.
- Ask students what they learned, found out, or saw at their stations
- Ask class if anything surprised them or varied hugely from their predictions
- Record new information/knowledge about air on the board and ask students to come up and share what they have learned
- Include category: ‘Further Questions/What we want to find out more about’ to board. At the end of the discussion (or throughout as necessary) include questions to this category.
- Ask students to put their names at the top of their sheet and hand it in at the end of class.

Tips:

- If students are coming up with incorrect ideas or unanswered questions be sure to include them into the ‘Further Questions/What we want to find out more about’ so that they may be investigated next class
- Prompt students by asking them if their predictions were true in all, or any of the centers

ELABORATION

- Explain to students that they may research questions under the ‘Further Questions/What we want to find out more about’ category at home, and we will look into it further the next day
- If students want to find out more about the properties of air, encourage them

to go to the list of approved sites and prepare a short presentation or journal entry to share with the class or teacher about what they have learned.

EVALUATION

- Students will be evaluated and assessed based on the observation sheet and journal entry from the engagement portion of the class (beginning)
- They will be assessed based on completion and accuracy
- See attached (Observation sheet)

ACCOMMODATIONS

- Students who need accommodations may watch videos of the previous experiments or search for experiments of their own online with a netbook or classroom experiment
- They may also complete the 4 stations but only partially, or not at all, complete the observation sheet
- Students who are not able to complete one of the stations may blow bubbles with bubble blowers and straws to 'see' air

Observation Sheet

<u>Station:</u>	Predictions	Observations	Results
1			
2			
3			
4			



Teacher:	Suzanne MacAulay
School/District:	St. Thomas University
Subject Area(s):	Science – Weather & Climate
Grade Level:	5
Date:	February 29 th , 2012
Lesson Duration:	60 minutes

Lesson Title: Representing YOUR Weather

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- provide examples of ways that weather forecasts are used by various people in their community.
- describe and predict patterns of change in local weather conditions.
- **Visual Arts:** Choose from a variety of art media to express a feeling, to communicate a message and represent people, places and objects.

Content to Be Taught: Students will learn how to observe and interpret different kinds of weather, ranging from sunny to stormy. To do this, students will first look at media sources to investigate how the weather is represented. From there, the students will put together an individual art project to represent how weather means to them.

Children’s Prior Knowledge and Misconceptions: Since this lesson also integrates an art component, the students will need to have some artistic background when it comes to using oil pastels, markers and collages. Students will also have some background on different weather elements and weather systems, such as clouds, the sun and storms.

No misconceptions are present in this lesson since it focuses on each students’ independent representation of the weather, which is unique to them.

Performance Objective: Upon observation of different weather representations in the media, such as magazine and videos, the students will describe artistically how they interpret local weather conditions.

Concept Development:

ENGAGEMENT (5 minutes)
<i>Materials:</i> YouTube video “Weather Slideshow” - http://www.youtube.com/watch?v=ZnRTkfcEbco
<i>Procedure:</i> To begin the lesson, the teacher will explain that today, the students will

be artistically representing how they see the weather in their area. To emerge the students in the topic, the teacher will begin by showing the students a YouTube video (link given above) that contains a variety of weather pictures. Encourage students to look at how the different elements in the sky are shaped and what color they are. It will be important to remember this when creating their collage.

EXPLORATION (35 minutes)

Materials: Magazines/catalogues (at least 1 for each student), scissors, glue (liquid or stick), oil pastels, markers, one page of construction paper (1 page per student), construction paper to be used at their discretion, a teacher model of a collage - see picture below for sample:



Safety: Scissors should be handled with caution and students should be supervised while using them. Students should never walk around with scissors in their hands and always ensure to put them in a safe place when finished.

Procedures: After viewing the video, the teacher will explain to the students that they will be making a collage of how they describe the weather of their local area. Instead of using words to share their thoughts, they will use colors and images.

Explain to the students that they will each have one piece of construction paper. They will have to cover that page with magazine and catalogue cutouts, as well as construction paper if extra paper or color is needed. Make sure to show the sample collage to the students.

Encourage them to use many different colors in their representation and to depict many weather elements, such as the sun, clouds and storms, which they often see in their local area.

Allow students to use their own scissors and glue to cut out pictures and shapes from the magazines and catalogues. Students may also use pastels and markers to add to their collage.

Give the students approximately 35 minutes to complete their collage and then have them clean up their station. They are to put the materials back where they found them and throw out any leftover paper in the recycle bin.

(Source: <http://www.crayola.com/lesson-plans/detail/weather-or-not...-lesson->

[plan/\)](#)

EXPLANATION (10 minutes)

Materials: Completed artwork on weather interpretations

Procedures: Once each student has finished their collage, regroup as a whole class and explain to the students that they will be sharing the elements of their collage and their meaning with a small group. Some areas they should touch on in their group discussions are:

- What colors were used? Why?
- What weather elements are present? Why?
- Were there different textures used? Why or why not?
- How do you feel about the weather? How does your collage represent that?

Ensure to post these questions on the board to ensure appropriate topics are known and discussed.

Ask the students to divide into groups of 4 and move into their groups. Allow the students about 10 minutes to share their artwork and discuss with other group members. The students will have to hand in their artwork once the discussion has ended.

ELABORATION (10 minutes)

Procedures: Next, in a whole-class class discussion, the teacher will talk about the students' artwork as a means of forecasting weather conditions. Elaborate on how certain colors are immediately associated with specific weather conditions. For example, bright and yellow signifies sunny weather, while dark and grey means that it is cloudy. People can forecast the weather by simply looking at the sky and interpreting the weather that comes along with certain colors in the sky.

Ask students to provide other examples of how we forecast the weather besides the method mentioned.

EVALUATION (done after the lesson by the teacher)

Procedure: The teacher will collect the collages and use the following rubric to mark each student's artwork.

ACCOMMODATIONS

Those students with fine-motor skill difficulties or any visual impairment may require the help of a fellow student or an EA. The teacher can pair up two students to complete one collage in this case, or have one student work near the student with difficulties so they can help them when needed.

To enrich this lesson, the students may use words and sentences in their collage as an additional component to describe their thoughts about weather.

Assessment rubric: Describing the Weather (Collage)

Name: _____

<i>Evaluation criteria</i>	<i>Not there yet</i>	<i>Getting there...</i>	<i>Made it!</i>	<i>Comments</i>
Science: There is evidence of weather elements in the collage.				
Art: Student used magazines/catalogues in collage and used color to represent the different weather elements. Their own creativity is evident through the collage.				



Teacher:	Katie Dow
School/District:	St. Thomas University
Subject Area(s):	Science: Weather Unit
Grade Level:	5
Date:	Wed., February 29, 2012
Lesson Duration:	60 minutes

Lesson Title: Weather Phenomena

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- identify examples of weather phenomena that are currently being studied.

Content to Be Taught: Students will learn about a variety of weather phenomena and natural disasters through their own (teacher and student – guided) exploration. Students will also teach others in their class about weather phenomena.

Children’s Prior Knowledge and Misconceptions:

- That natural disasters do not occur in Canada
- That weather phenomena is bad for people, the environment, and the world as a whole
- Weather just happens randomly

Performance Objective: During this lesson students will independently learn, and teach their peers about a chosen weather phenomena. They will be responsible for researching and compiling a project and presentation for the class. Students will have multiple opportunities to research using a variety of tools. They will be introduced to the topic through a smart board activity and be assessed on their oral presentation and the project they complete.

Concept Development:

ENGAGEMENT – show tornado
<p><u>Materials:</u></p> <ul style="list-style-type: none"> • Tornado in a bottle (instructions here: http://www.on.ec.gc.ca/skywatchers/exGamesAct/activity_tornado_e.html) • Stopwatch <p><u>Procedure:</u></p> <ul style="list-style-type: none"> • Show students the bottle and ask for/record some predictions about it, what

it represents, and what it does, on the board

- Hold the 2 bottles by the neck; invert them so that the bottle containing the water is on top, and immediately start spinning them in circles
- Put the bottles on the table, with the empty one on the bottom
- Watch what happens
- Repeat (flipping over first), timing to see how long it takes for the water to drain through (over multiple times if necessary).

Safety:

- Test first to ensure that the water doesn't leak out and that it is sealed properly
- If students are going to try the tornado on ensure that they do not hit each other and that they understand how the tornado properly

Tips:

- If the tornado does not work, for some reason, then show students one or both of these videos; (<http://www.youtube.com/watch?v=reEQfVVeUw> or <http://www.youtube.com/watch?v=oaC3MN7x70k>)

EXPLORATION -natural disasters s.board

Materials:

- Smart Board (see attached screen shot)
(http://exchange.smarttech.com/search.html?q=hurricanes&subject=-All+subjects&grade=All+grades®ion=en_CA#page=4)
- "DK Eyewitness Books: Natural Disasters" – by Claire Watts & Trevor Day

Procedure:

- Go through Smart Board activity slides in order, with students.
- Have students take turns coming up and interacting with the Smart Board (most slides are student directed)
- For slide 3 get a variety of students to come up and play disaster dice (the aim of the game is for the students to name what type of disaster is shown on the dice).
- For slides 4 & 5 have a variety of students come up to the board to erase and find the answers.
- Use slide 6 to review what students have learned, asking them first to answer the question, then move the balloon to discover the answer.

Safety:

- Monitor students as they use the Smart Board

Tips:

- If the Smart Board slides are not working, then read book "DK Eyewitness Books: Natural Disasters – by Claire Watts & Trevor Day" – look at page 42 (Twisting Tornadoes) and then go to the glossary and look at other parts of

the book based on student interest

EXPLANATION

Materials:

- A variety of resource materials such as; computers with Internet access and list of approved sites (see attached), library or books on weather and climate, encyclopedias, etc.

Procedure:

- Explain to students that they are going to be placed in groups and asked to work on a project. They will be focusing on one natural disaster and be responsible for teaching the class about it.
- They will have time to work on this project in class and at home
- Before beginning the project students will have the rubric explained to them and have a chance to ask questions.
- Group students according to varying abilities and those who work well together. If you prefer, allow students to group themselves. It would work best with 3-4 students in one group (roughly 5 groups in total)
- The remainder of this class will be spent in the library where students will have a chance to do research and consult with the teacher or librarian.
- If available, they may also use computers to conduct their research (using the websites provided – or others suggested by the teacher or librarian)

Safety:

- Internet safety – check websites before students use them

Tips:

- Group students strategically depending on the members of your class
- Place EA's (if available) with groups who may benefit from their help
- Ask the librarian (beforehand) to locate some of the materials that may be useful for student research
- Help students decide how to split up group work and figure out what should be done at school and what can be done at home (research, printing things off, etc.)

ELABORATION

Materials:

- Resource and research materials (see above)

Procedure:

- Students who need an extra challenge, or who are finished their project before others, may look for an experiment to go along with their weather phenomenon/natural disaster, or find an interesting video to include with their project and presentation.

Safety:

- Be wary of Internet safety and check all videos/internet material is suitable

and safe to show in front of the class.

Tips:

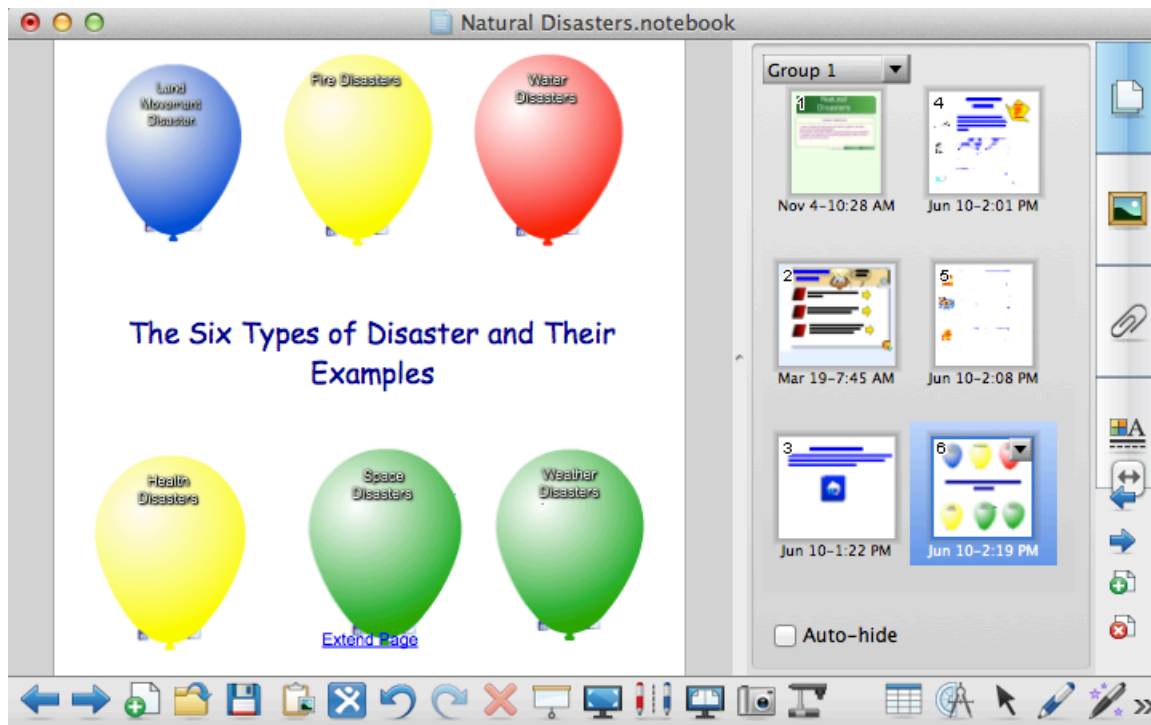
- Point students in the right direction and offer them books about science experiments and websites which may be helpful

EVALUATION

- See attached rubric: 5th Grade Oral Presentation Rubric

ACCOMMODATIONS

- Students may be provided with a set of information (found and prepared by the teacher) about one weather phenomena
- They may also have the presentation rubric halved, or may not have to orally present their project
- Students may need extra help from an EA for fabricating and organizing their poster



5th Grade Project Oral Presentation Rubric

		1	2	3	4
Non-Verbal Skills	Eye Contact	Student reads with no eye contact	Student occasionally uses eye contact, but still reads most of presentation	Student maintains eye contact with the audience during most of the presentation	Speech is memorized and notes are hardly, if at all, used
	Posture	Slumps or leans during presentation	Sways or fidgets during much of presentation	Occasionally sways or fidgets, but stands up straight with both feet on the ground most of the time	Stands up straight and still with both feet on the ground
Vocal Skills	Enthusiasm	Shows absolutely no interest in the topic	Shows some interest in the topic	Shows positive feelings about the topic presented	Demonstrates strong positive feelings about the topic during the entire presentation
	Elocution	Student mumbles, incorrectly pronounces terms, and speaks too quietly for students in the back of class to hear	Student's voice is low-medium, incorrectly pronounces some terms, audience still has some difficulty hearing presentation	Student's voice is clear and pronounces most words correctly. Most audience members can easily hear the presentation.	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation
Content	Time Frame	Presentation is less than minimum time		Presentation falls within required time frame	
	Organization	Audience cannot understand presentation because there is no sequence of information	Audience has some difficulty following presentation because student jumps around	Students presents information in a logical sequence which audience can follow	Student has a good hook and presents information in logical, interesting sequence which audience can easily follow
	Subject Knowledge	Student does not appear to have a grasp of information; cannot answer questions about subject	Student is comfortable with information, but is only able to answer simple questions	Student is at ease with information and answers questions satisfactorily, but fails to elaborate	Student demonstrates full knowledge (more than required) and can answer and elaborate on most/all questions asked
Extra <small>(not required)</small>	Visual	posters photos	props slideshow	power point video	artifacts other

GREAT WEATHER WEBSITES!

<http://eo.ucar.edu/webweather/> - Practice forecasting the weather for yourself and learn about different types of weather conditions!

<http://www.weatherwizkids.com/> - Play games, learn about the weather, and create your own experiments all presented by a real meteorologist!

<http://theweatherchannelkids.com/> - Explore the weather from The Weather Network, the same channel that your parents get their weather info!

<http://skydiary.com/kids/> - Learn great facts about tornadoes, lightening, hurricanes, and storm chasing!

<http://www.tornadochaser.com/2000projects.htm> - This page from the Tornado Chasers site includes information on tornados, lightning, hail, and rainbows!

<http://www.wxdude.com/> - Learn about all different kinds of weather from the Weather Dude (includes music)!

<http://www.sciencekids.co.nz/weather.html> - Get some great information about science experiments that are fun and easy!



Teacher:	Katie Dow
School/District:	St. Thomas University
Subject Area(s):	Science: Weather Unit
Grade Level:	5
Date:	Wed., February 29, 2012
Lesson Duration:	60 minutes

Lesson Title: Global and Environmental Concerns

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- describe how studies of the depletion of the ozone layer, global warming and the increase in acid rain have led to new inventions and stricter regulations on emissions from cars, factories, and other polluting technologies.

Content to Be Taught:

- The environmental concerns of pollution, climate change, global warming, and the greenhouse gas effect
- Possible solutions for environmental issues

Children’s Prior Knowledge and Misconceptions:

- Global warming means that the world is getting warmer all the time
- There is pollution everywhere and it is bad for the environment
- Pollution is garbage in the ditches and dumping things in the water

Performance Objective: In this lesson students will learn about several different environmental concerns that are evident in the world today (and how they impact the earth). Students will complete a project where they invent a solution to one environmental issue that they research and learn about. Students will be expected to present and teach the class about their environmental issue and the solution (‘invention’) that they have created.

Concept Development:

ENGAGEMENT (10 minutes)
<p><i>Materials:</i></p> <ul style="list-style-type: none"> • Smartboard/Whiteboard (and markers) <p><i>Procedure:</i></p> <ul style="list-style-type: none"> • Ask students to raise their hand if they have ever heard of global warming • Ask students to raise their hand if they can explain what global warming is. Call on a few students to explain global warming and jot a few things on the

board (help students use the proper terminology; ozone layer, depletion, pollution, gases, emissions, etc.)

- Once students have begun thinking about these words, create a brainstorming cloud/web on the board, which extends to the factors associated with global warming and the greenhouse gas effect.
- Have students come up and add elements to the cloud/web

Tips:

- If students are struggling to understand and contribute then begin the discussion with pollution and students knowledge of the concept. From here continue to explain how global warming and the greenhouse

EXPLORATION (time: 15 minutes = 5 for video + 10 for discussion)

Materials:

- Greenhouse Gases video:
(<http://www.epa.gov/climatechange/kids/basics/index.html>)
- Global Warming Video: (<http://www.youtube.com/watch?v=GBQ8-zEcE9w>)

Procedure:

- To answer students questions and queries about global/environmental issues that arose from the class discussion, the class will watch the greenhouse gases video (see above) and the global warming video (see above)
- We will then come up with a list of examples of these effects in our lives (common to students and the world) – students will work in small groups (table groups) and come up with a list of at least 4 examples. The groups should narrow down one example that they think is most important
- These examples will then be shared with the class by a representative from each group

Tips:

- Be aware of student groupings and those who may be working together during the discussion

EXPLANATION (time: 35 minutes & continued [as well as homework])

Materials:

- A variety of arts and crafts materials, plastic and paper bags, a variety of several household items, etc.
- Resource material for research (library or class books about global environmental issues, classroom netbooks or computers, etc.)
- Sufficient space for students to lay out materials and work
- Rubric (see attached 'Invention Rubric')

Procedure:

- Have students work in their table groups to create a solution or invention to

help counteract or deal with one of the issues that they have identified in the previous small group discussion

- Explain to students that today they are all going to be environmental scientists and they are responsible for coming up with a solution to an issue. They may choose one of the issues that they came up with and brainstorm some possibilities
- The teacher will go over and answer questions about the rubric before heading out and beginning the project
- Students should prepare a 'prototype' of their solution, as well as a ½ page write up to go along with their project. The write up should include their reasoning for creating their 'prototype' as well as how it works and what problem it solves
- Students will (once the projects are complete) present their idea to the class

Safety:

- Ensure that students are using the arts and crafts materials economically and safely

Tips:

- If students are having a hard time coming up with ideas for their prototype, invite them to do research on solutions that already exist to get them thinking about some good possible solutions

ELABORATION

Procedure:

- If students are finished early, or want to go to the 'next level' with their project, then they may come up with an advertisement for their 'prototype' which promotes it to the public and possible buyers (they may create an ad or proposal presentation promoting their product)
- Students might also create some questions to ask an environmental expert (if all students have time to do this then the class may compile an email which will be sent to an expert)

EVALUATION

- Students will be assessed based on the rubric (see attached) 'Invention Rubric'
- Total mark out of 16 (plus 4 potential bonus points)

ACCOMMODATIONS

- Students may be presented with an already created 'environmental solution' and be asked to research it and share the information with the class
- Students might also identify a concern in their everyday life that negatively impacts the environment and propose a solution in written and/or physical 'prototype' format

Invention Rubric

	4	3	2	1
Originality and usefulness of this invention	This invention is very creative, shows a great deal of originality, and could be quite useful	This invention is creative, shows originality, and could be useful	This invention is a springboard or variation of something that has already been invented	This invention appeared to be thrown together at the last minute and it is evident that very little thought was put into it
Name of invention	The name for this invention is very clever and creative. It is apparent that the student(s) put a great deal of thought into it.	The name for this invention is clever and creative. It is apparent that the student spent time thinking of this name.	The name for this invention is somewhat clever or creative	The name of this inventions seems as if the student(s) hurriedly came up with it
Comprehension of issues and concepts	From the project and write up it is very clear that the student(s) understand the importance of global/environmental issues	From the project and write up it is clear that the students have an understanding of the importance of global/environmental issues	From the project and write up it is not evident that students grasp the importance of global/environmental issues	From the project and write up it is not evident that the students have any knowledge of global/environmental issues
Completion	- The invention was very clearly explained and discussed by all members of the group through the presentation and write up - The project is complete with all elements and group members name and contributions clearly indicated	- The invention was explained by all members of the group through the presentation and write up - The project is complete with all group members names and contributions	- The invention was somewhat explained by some group members through the presentation and write up - The project is somewhat complete with some group members names and contributions	- The invention was not explained or made clear by group member in the presentation or write up (seemingly thrown together last-minute) - The project is incom

** Bonus Points may be awarded (up to 4) for Elaborating on your project in one of the ways discussed in class



Teacher:	Suzanne MacAulay
School/District:	St. Thomas University
Subject Area(s):	Science – Weather & Climate
Grade Level:	5
Date:	February 29 th , 2012
Lesson Duration:	60 minutes (<i>half of the lesson is done the first day, and the second half is done a week later</i>)

Lesson Title: An Acidic Weather Phenomenon – Acid Rain

NSES Outcomes: All students should develop an understanding of objects in the sky and changes in the earth and sky. Therefore, they are able to understand that the weather changes from day to day and over the seasons, and that the weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.

Curriculum Outcomes: Students will be expected to

- identify examples of weather phenomena that are currently being studied; in this case, acid rain.

Content to Be Taught: Students will learn about acid rain and what it is. A hands-on experiment will help students conclude the effects of acid rain on our environment. To further their understanding, other side effects of acid rain will be discussed further.

Children’s Prior Knowledge and Misconceptions: Students will have knowledge about general weather elements, including rain. Students will need to know where rain comes from and how it is formed to understand acid rain.

A common misconception on the topic of acid rain is that it is unnaturally produced. Also, it is important to note that there is some acid in all rain. This is beneficial for plants since the acidity helps the plants dissolve their essential nutrients. (*Source:* <http://librarytech.org/learningzone/meteorology1.html>)

Performance Objective: After reading a book to the students about the effects of acid rain on animals and the environment, the class will conduct an experiment all together to test the effects of acid rain on grass. This experiment will require follow-up a week later. After the week has passed, the class will observe the changes that took place and engage in a discussion about the effects of acid rain on our world. Students will need make a poster, to be evaluated, to demonstrate their understanding of the topic.

Concept Development:

ENGAGEMENT (10 minutes)
<i>Materials:</i> Online book “The Tale of Lucy Lake” - http://www.epa.gov/acidrain/education/site_kids/lucy/1.htm

Procedures: The teacher will read the online book aloud mentioned above, which highlights the effects of acid rain on a group of frogs living in a lake in the forest. The book also presents the cause of acid rain and what people can do to help reduce its presence.

After reading the book, discuss and review with students what they learned from the book. Ask if any of them knew about acid rain before reading the book and ask them to explain their previous knowledge. It is essential to highlight three main categories during the discussion with the students:

- 1) How acid rain is formed.
- 2) The effects of acid rain.
- 3) How we can help prevent acid rain.

EXPLORATION (15 minutes)

Materials: 2 glass jars, water, vinegar, two small pieces of sod (to fit in the jars), whiteboard & markers

Safety: Ensure to check for allergies before beginning the experiment with the students. Make sure that no students are allergic to vinegar or grass. Since the teacher will be conducting and overlooking the experiment, there are no other safety dangers present.

Procedures: Explain to the students that in this experiment, they will be investigating the effects of acid rain on grass. To depict the acid rain, they will use vinegar, since it is very acidic.

To complete the experiment, have the two jars ready on a table. Have the students regroup around the table where the experiment is being conducted. The teacher may ask the students to come up and help with the experiment. Next, pour $\frac{1}{4}$ cup of water into one jar, and $\frac{1}{4}$ cup of vinegar into the other. Next, place one piece of sod into the jar of water, and the other into the jar of vinegar. Ensure that the sod's soil is fully immersed in the liquids.

Once the experiment is done, explain to the students that they will have to leave the jars in a sunny, warm place in the classroom (i.e. a windowsill) for a week or so. Have the students return to their desk and have them predict what will happen to each piece of sod. Note these on the whiteboard with them. This will be the end of this Science lesson for the day.

(Source: <http://tlc.howstuffworks.com/family/science-projects-for-kids-weather-and-seasons13.htm>)

EXPLANATION - to be done a week after the experiment has been conducted (15 minutes)

Materials: 2 jars from experiment completed a week ago

Procedures: Based on the experiment from the week before, students will now observe its results. They will need to observe and compare what happened to the sod in the jar with vinegar versus the jar with water.

The students will notice that the sod in the jar with water is alive and well – it is green and healthy. Meanwhile, the sod in the jar with vinegar will look almost polluted – the grass will be faded and it may be dried out. Discuss with the students why they think this may have happened and have them reflect back on “The Tales of Lucy Lake”.

ELABORATION (10 minutes)

Procedures: Based on the findings from the experiment, the teacher can then lead a discussion on how acid rain may effect other parts of the environment and our world overall.

For example, discuss with the students how acid rain can affect buildings and infrastructure since the acid can eat away at certain materials. Also, it is important to notice the unhealthy side effects of acid rain for animals, plants and humans. Acid rain can make us sick.

Next, elaborate on the importance of helping our environment to reduce the occurrence of acid rain and its effects. It is important for students to remember that acid rain can be created naturally, but most often, humans are the main causes. We need to remember to reduce pollution and help clean up the environment whenever possible. Ask students to suggest ways we can do this. Suggestions may include:

- Recycle.
- Walk or use a bicycle instead of a car, when possible.
- Compost.
- Turn off any lights and electronics when not in use.

EVALUATION (to be assigned to the students at the end of the lesson – 10 minutes to explain and begin in class)

Procedures: As a project to demonstrate their learning, the students will have to create a small poster about acid rain, containing images and a few facts they learned. Explain to them that this will be due in a week. Make sure to make it clear to them that their poster must be colored in, and include both images and some facts about acid rain that they learned through the experiment and discussion from class.

The poster can be done on a basic 8’ by 11’ piece of paper. Allow them some time to brainstorm ideas in class and they may ask the teacher any questions to guide them.

Ensure to give the students the following checklist in order to make expectations clear to them. The teacher will grade their poster based on this checklist.

ACCOMMODATIONS

Since the teacher will be conducting the experiment with some help from the students, the teacher will be there for any students who need help and have motor difficulties.

For any students who need additional support, they may complete the poster, but only focus on using images, rather than words. Images will help them understand the topic and will keep them engaged. The teacher may help them plan their poster

in class to reduce frustration at home.

Meanwhile, those students who need enrichment may choose to do a brochure instead, which contains more writing and higher-level thinking. In the brochure, the student can explain in detail the three main components studied:

- 1) How acid rain is formed.
- 2) The effects of acid rain.
- 3) How we can help prevent acid rain.

Poster: Acid Rain

Name: _____

Poster components	Yes	No
Images presented depict acid rain, its effects, and how we can prevent it.		
There are facts on the poster about acid rain, its effects, and how we can prevent it.		
There is evidence of classroom material on the poster.		