

## **Know Our Planet**

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### **INTRODUCTION**

One of the major decisions that my family and I made was in 2003, when I accepted the offer to teach at Houston Independent School District (HISD). We moved from the Philippines to Texas. I had no problem with the weather when I lived in the Philippines and Thailand. In my homeland, I could tell whether we were going to have a typhoon (better known as hurricane in America) and where the places were that were going to be flooded in the city. I could prepare myself when caught in a stormy situation. That is why when I moved to Houston, I could not imagine having to experience a flash flood. I thought the flood control projects in Houston, Texas, would work efficiently, especially as compared to those in my home country. However, when that fateful rainy day came, I had an experience I will never forget. I learned that flash floods could happen, even in a technologically advanced country such as the United States of America. When the weather is stormy, flash floods can happen.

This experience gave me an interesting idea to create a curriculum that will spark the interest of my second-language learners. I knew that if I planned a unit and used this experience as my story starter, I would succeed in teaching my second-language learners language and academic competence. Let me entice you to read along with me as I begin the details of my experience that lead to the creation of this Know Our Planet Curriculum.

That morning, as I looked outside the classroom window, the sky was dark and the heavy rains continued to pour. There were many students who missed school entirely. By lunchtime, parents had started coming to school to pick up their children. They were worried that the streets were getting flooded or a flash flood might occur. I thought to myself, how could it flood in Houston Texas? Knowing how advanced the U.S. technology is in the city of Houston. I assumed it must have its own flood control plan. No, I was not going to experience any flash floods. I was not worried about floods until I left school. It was raining heavily, and as I turned right to the main street, I was shocked to see that there were stalled cars two meters away from me. The water was too high for cars to drive through. I panicked and decided to drive back to school. I could not imagine going through that flash flood. One car was submerged with water up to its bumper. I saw a blue pick-up truck that was also stalled.

I was so thankful that I made it back to school safely and relieved to see that my principal and colleagues were still there. We stayed in the principal's office with our eyes glued on the television news, watching the weather channel as well as the evening news. The newscaster warned the viewers that people who were in the flooded areas had to stay indoors, and drivers should wait for the water levels to subside. I had to phone home and tell my family that I was dry and safe in school. My colleagues and I had to make ourselves comfortable, for if the water level continued to rise, we had decided to stay overnight at the school. I had to wait for eight hours before driving home. As a matter of fact, I was the first one to leave school. I made a phone call as soon as I reached Loop 610 to tell everyone that the water had subsided and that it was safe to drive home. I just couldn't believe it would be flooding in Houston -- not in here America!

This is how the idea for my curriculum unit came about. The following day my students were asking questions about what happened to me, knowing that I lived across town. They began telling me stories about how they got home that stormy day. I gave a mini-lesson on floods, including a discussion of safety rules about flooding. In my geologic hazards (HTI) seminar at the University of Houston, I knew that this would be the beginning of my new curriculum unit, one that would be of high interest to my students.

The class started with a discussion of flooding in Houston. Some of the students remembered the stories their parents told them about what happened during the flooding caused by Tropical Storm Allison in 2001. For instance, one of my students' cars was submerged in the flood. His father was unable to drive it home and just left the car on the road. When the father picked it up the next day, the car was damaged beyond repair. Unable to pay for flood insurance, the family had to go without a car for quite some time. I told the sad story of a colleague of mine. Her house was flood damaged and was not covered with homeowner's insurance policy. She felt that after the storm she had to rebuild her life again. Thankful that she lived after being caught in a flash flood, she nonetheless had a challenging time rebuilding what she lost.

I had no first hand experience with Tropical Storm Allison, yet after listening to a colleague, I became interested in the flooding caused by this unforgettable storm. It was hard to imagine that Texas suffered such great losses, both in terms of the people who lost their lives during the storm and the damage to property measured in billions of dollars. I believe real-life stories about this and other floods (see case studies below) will capture the attention of my ESL fourth graders. I intend to talk or interview people such as Dr. Dupre' and other colleagues who experienced the Tropical Storm Allison. I know this will help built up the interest of my students, not only for the events, but also to learn science.

I plan to design a science unit that will be a chapter within a larger curriculum, Know Your Planet. In fourth grade we study recycling, environmental awareness, and weather study (safety, hazards and disasters). The unit I will create falls nicely within our study of weather. Using the literature approach to create this weather curriculum, I know that real stories will help students succeed with their science lessons and use their creativity to do science experiments.

## **CASE STUDIES OF FLOODS**

### **Tropical Storm Allison, 2001**

When I discussed the news article (from the *Houston Chronicle*) regarding some of the events that happened during Tropical Storm Allison, most of my students were all eyes and ears listening to me. On June 5, 2001, Tropical Storm Allison formed 80 miles off the southeast coast of Texas and it made landfall by Tuesday evening. Up to 38 inches of rain fell during the course of five days. The resulting flood was the most costly flood in U.S. history (*Tropical Storm Allison Recovery Project*).

The economic damages caused by Tropical Storm Allison were huge. Harris County alone had an estimated five billion dollars worth of damage. There were 73,000 flooded residences, many of which were completely destroyed. Over 2, 800 residences sustained "substantial" damage, i.e. the structure suffered damage equivalent to at least 50% of the value of the structure. The flood also damaged buildings, the downtown tunnel system and related infrastructure, and many parking garages. For this reason, many workers were displaced in businesses. Floodwaters damaged medical equipment stored at a warehouse near the Texas Medical Center, drowning 30,000 animals that were in the labs for research projects. As a result many of the research projects were delayed or ruined. Four hospitals in the Texas Medical Center were closed temporarily due to flooding and damaged electrical equipment. The patients and health care providers were severely affected by the difficult situations after the flooding. The 95,000 flooded

automobiles and trucks that were parked in residences' garages and underground garages, as well as those on flooded roads and highways, cost 450 million dollars to repair. The impassable highways and major roads suffered 5.5 million dollars in damages. Two hundred Houston area schools and three major universities sustained damages that are estimated at 250 million dollars. Eleven government buildings cost 19.6 million dollars to repair and flood proofing. The cost of repairing or replacing Harris County facilities has reached 40.5 million dollars. To date, the City of Houston has spent over 53 million dollars to repair city-owned facilities (*Tropical Storm Allison Recovery Project*).

### **Mount Pinatubo, 1991**

Once their attention is caught with Tropical Storm Allison, I can then use examples of other devastating floods. I would give my second-language learners another interesting natural disaster, the eruption of Mount Pinatubo, that I had experienced first-hand when I was in my home country. I could not see how the eruption would affect me, as I lived in the city that is three hours drive away from Mount Pinatubo. I had learned about Mount Pinatubo in my social studies classes, but then it remained just another volcano until I experienced the falling volcanic ash that blanketed the city of Manila.

The Philippines has three main islands: Luzon, Visayas, and Mindanao. Mount Pinatubo is an active volcano located in the island of Luzon, at the intersection of the borders of the provinces of Zambales, Bataan and Pampanga (see reports by Decker and Decker; Wolfe). This densely forested area is inhabited by the Aeta, an indigenous people who fled to these mountains from the lowlands when the Spaniards conquered the Philippines in the 1560s.

Mount Pinatubo erupted in 1991 after 500 years of dormancy. It produced one of the largest and most violent eruptions of the 20<sup>th</sup> century. Many lives were saved due to the successful predictions of the eruption. Over 60,000 people were successfully evacuated from the surrounding areas; however, the surrounding areas were severely damaged by lahars caused by the rainwater remobilizing earlier volcano deposits, and thousands of houses were destroyed.

The effects of the eruption were felt worldwide. It ejected large amounts of aerosols into the stratosphere—more than any eruption since that of Krakatoa in 1883. The aerosols formed a global layer of sulphuric acid haze over the following months. Global temperatures dropped by about 0.5 degrees Celsius (0.9 degrees Fahrenheit). That explains why I had experienced the sulphuric acid haze in the city of Manila.

Before Mount Pinatubo erupted in 1991, there were 15,000 people living in the small villages on the volcano's flank. There were about 500,000 people living in the cities and villages on the slopes surrounding the volcanoes. The United States of America's Clark Air Force Base was 40 miles southwest of Mount Pinatubo. There was a major eruption and earthquakes that caused the destruction of the cities and villages situated close to Mount Pinatubo. Even the U.S. bases were evacuated because of the ash emission and the episodic harmonic tremors. Wind patterns changed on June 15, as Typhoon Yunya was approaching the Philippines and the South China Sea, to the southwest of Mount Pinatubo.

On July 19, 1990, an earthquake of magnitude 7.8 (comparable in size to the 1906 San Francisco Earthquake) struck Central Luzon. Some volcanologists believed that this triggered the March 15, 1991 eruption. The local villagers reported steam coming from the volcano, but the scientists visiting Mt. Pinatubo found that small landslides rather than any eruptive activity were responsible.

When the volcano erupted, the periodic earthquakes were joined by volcanic mudflows (lahars) and pyroclastic flows. The heavy rains mixed with volcanic ash to cause great mudflows that eroded the Abacan River through Angeles City, undercutting the banks and destroyed the

homes and bridges connecting the north and south parts of the city. These lahars buried the North Expressway through Central Luzon, causing ten fatalities.

The annual monsoon rains in July generated more floods and lahars that cut off roadways and buried towns, agricultural lands, homes, and bridges (Wolfe). Remotely monitored data from seismographs, rain gauges, and flow sensor instruments allowed the Philippine Institute of Volcanology and Seismology (PHILVOCS) to issue evacuation warnings that minimized the loss of lives. Nonetheless, the people were economically and socially devastated. The damage caused by Mount Pinatubo's eruption and related earthquakes, lahars, and floods will never be forgotten by the residents of these devastated areas. This was the most traumatic experienced in their lives.

### **Great Johnstown Flood**

Dr. Dupré, the Living with Geologic Hazards seminar leader, gave several lectures on flooding that included several case studies. One of these was the 1889 Great Johnstown Flood in Pennsylvania. One of my classmates gave an excellent presentation about that flood as well. His PowerPoint presentation will be very useful when I teach the unit. Lastly, the book by McCullough provides a wealth of material, as summarized below.

Floods were common in Johnstown during the 1800 because of its location adjacent to streams within a valley. The Pennsylvania Mainline Canal was completed in 1831. The Allegheny Portage Railroad was opened in 1834. Five years later, in 1839, the Commonwealth of Pennsylvania started to build a structure to dam the South Fork of the Little Conemaugh to be used in times of drought for the canal basin in Johnstown. After fourteen years in 1853 the South Fork Dam was completed. The following year, 1854, the Pennsylvania Railroad completed the Horseshoe Curve that connected Philadelphia and Pittsburg by rail. In 1862, the South Fork Dam failed for the first time, causing the lake to drain. In 1875, the Pennsylvania Railroad sold the property to Congressman John Reilly from Altoona. Four years later Congressman Reilly sold the property to the South Fork Fishing and Hunting Club. It took more than two years to repair the dam.

The Johnstown Flood disaster was the result of several days of heavy rainfall. The failure of the South Fork Dam, situated 14 miles upstream from the town of Johnstown Pennsylvania, unleashed a torrent of 20 million gallons of additional water, the force of which was comparable to Niagara Falls. The floodwaters rose approximately 35 feet above the adjacent floodplain, caused tremendous economic as well as social devastation. There were 2,209 fatalities, almost 10% of the total population of 23,000 living in the valley at the time. There were 1600 homes destroyed, as well as 280 businesses. Economic losses were approximately \$17 million (McCullough 196).

The flood was one of the greatest natural disasters in U.S. history. It was the first major disaster relief handled by the newly established American Red Cross. Its founder, Clara Barton, spearheaded the disaster relief for the victims. She brought 50 doctors and nurses to help the people. Clara Barton stayed there for five months, working hard to help the victims. The flood disaster, also known as the 1889 Great Flood, became one of the most famous events of the 19<sup>th</sup> century, second only to the assassination of President Abraham Lincoln.

### **UNIT BACKGROUND**

Children learn best when presented with a variety of media, such as books, films, videos, field trips, and hands-on experiments. As an ESL teacher, I will make sure that their language competence is developed through their listening, speaking, reading, and writing skills, as well as their content mastery. Literature adds a dimension to the study of science that is often forgotten or overlooked. My students will be able to relate to the stories because children love stories. I have chosen two books for my core literature. These are *The Magic School Bus inside a*

*Hurricane* and *The Magic School Bus at the Waterworks* both written by Joanna Cole and illustrated by Bruce Degen. This month-long unit on weather will begin with *The Magic School Bus at the Waterworks*.

To summarize this story, Ms. Frizzle and her class goes on a field trip to the waterworks. Her students are asked to collect ten interesting facts about water. The magic school bus takes them to the waterways and experiencing evaporation, the water cycle, going through the process of water purification, and understanding water pressure. Finally the class returns and they sum up their experiences. The students get to write about their magic school bus trip to the waterways. Using this story, my students will be able to create a water chart that shows evaporation, condensation, water purification process, and water distribution. The story has the basic science vocabulary that will be used when we continue our weather unit.

The next step is for the students to learn about Ms. Frizzle, the science teacher taking the students in her magic school bus and teaching them about the weather, such as the rain, snow, sun and wind. She requires her students to do a weather project and even listen to weather reports. One of the most interesting parts of the story is the part when the students and Ms. Frizzle experienced the hurricane as it approached the land. Ms. Frizzle told the class, “In 1900, more than 6,000 people drowned when a storm surge swept across Galveston Island, Texas.” A long time ago people did not expect that to happen, but today, according to Ms. Frizzle, hurricane predictions save lives. This information is understandable for the students and at the same time enjoyable to read, because Ms. Frizzle’s students were experiencing the hurricane and fell into the ocean where a tornado picks them up. She told them “tornadoes often occur at the edges of hurricanes and are moving over land.” These two great books written by Joanna Cole will enable the students to learn about the weather awhile enjoying the humor of Ms. Frizzle’s class.

After reading the articles about Tropical Storm Allison, I learned that it was the most costly tropical storm in Texas history. This is why I thought that this storm would be my springboard to design a curriculum unit about the weather, a unit that would help my students understand why natural disasters could happen anytime.

I plan to design a Science Unit that will be a chapter within a larger curriculum, Know Your Planet. In fourth grade we study recycling, environmental awareness, and weather (e.g. safety, hazards and disasters). The unit I will create falls nicely within our study of weather. Using the literature approach to create this weather curriculum, I know that real stories will help students succeed with their science lessons and use their creativity to do science experiments.

### **Weather (Our 3<sup>rd</sup> Unit)**

There are four aspects of weather that must be understood by students. First, students need to be able to understand that weather cannot be stopped; it can only be dealt with. Next, they need to know that some parts of the weather can be predictable and the other parts cannot. They further need to learn that disasters are parts of life, and there are lessons learned from disastrous events. Finally, they must learn how to prepare for disasters such as floods and hurricanes.

I mentioned earlier about the class discussion. The day after the storm, my ESL fourth graders came to school with so many questions about the weather. One of the most challenging questions was how floods affect peoples’ lives. Some of them got scared because the water was too high. Their parents had a hard time driving through the high water and did not want to get stuck in the middle of the road. Although I am not the science teacher, I can use their high interest to create a curriculum that is literature-based. My ESL students will study the weather and work on their listening, speaking, reading, and writing skills to develop their language and academic competence. It will also challenge them to develop their higher order thinking skills.

In my school, teachers and administrators work hand in hand to maximize students learning. Two of our goals are to teach the students the Grade level Curriculum in fourth grade and have students pass the Texas Assessment of Knowledge and Skills (TAKS). We prepare them for the standardized tests and district assessments in order that they can pass on to the next grade level. That's why we only have PE and library for our weekly ancillary. The forty-five minute recess in our daily class schedule was allotted to added instruction/learning time. The teachers' and the students' energy will be used to continue instruction. I will create this unit to channel my ESL fourth graders' energy into preparation for, respect for, and understanding of how weather affects us. When I teach this unit I will provide an aligned CLEAR and TAKS curriculum so that my students will achieve the objectives and at the same time enjoy the learning process.

### **IMPLEMENTATION STRATEGIES**

The integration of language arts and science will enable the students to succeed in their listening, speaking, reading, and writing skills, as well as improving their academic language competencies. The lessons will have to be aligned with CLEAR and TAKS curriculum. Instead of taking trips on a Magic School Bus, my students will do a lot of hands-on experiments and weather projects. In language arts, the students can choose their favorite literature, create their own plan, and in doing so, celebrate learning. They can design questions to ask teachers or friends who experienced the Tropical Storm Allison. They can then use their writing skills to enhance not only their language competence but also their content mastery.

I have chosen to integrate language arts and science in an attempt to design a series of lesson plans that address both content and language acquisition. An important part of my pedagogy is to make students active participants in their learning. Understanding how second language learners can best acquire their second language best will help them to be serious and effective students.

The combination of language acquisition strategies with the mastery of content is an ongoing challenge for me as an ESL teacher in HISD. The alignment of CLEAR Science Curriculum and my English as a Second Language and the Language Arts Curriculum is a goal I hope to attain in the years to come.

The lesson plans designed for use in the curriculum unit are an example of what the integrated curriculum might look like. My lesson plans for the second language learners will focus on their listening, speaking, reading, and writing skills as well as academic competence in the area of science. In using the literature approach I will find the best trade books that are interesting to the learners as well to the teacher. My choices include *The Magic School Bus at the Waterworks*, *The Magic School Bus inside the Hurricane*, and *The Lorax*.

As part of our unit on weather, my students will also be doing science projects, reading and responding to weather-related themes, writing about the weather, applying math concepts to weather studies, using social studies to understand the weather, and creating weather tools, instruments, charts, arts and crafts. The culminating activity of this unit will be the performing a weather-based play. All of these activities will enhance student learning and enjoyment, as well as to help ensure they pass the end of the year tests needed to advance to the next grade level.

HISD promotion standards require the fourth graders ESL and native speakers to have passing scores on their Stanford 10 test, the Math, Reading, and Writing TAKS, as well as passing grades on their report card. Therefore, as their teacher, I will be working on their writing skills to make sure my students pass the Writing TAKS.

During my years of teaching, I have found that there are some writing assignments that appeal to second language learners. One is to assign writing stories that are copy-changed versions of the original stories. For example, students writing a copy-changed version of *The*

*Magic School Bus in the Waterworks* could be *The Magic Spaceship in the Waterworks* where the students would create their own characters, setting, and plot.

Second language learners also enjoy writing their own plays. Writing and presenting a play could be one of our culminating activities. The students would be divided into groups of four or five. The teacher can assign different roles to them, such as main characters, director, costume designer, set or props manager, and narrator. Students usually prefer to be one of the main characters and disregard the other parts, a fact that can be challenging at times for the teacher. To avoid this difficulty, the teacher could make a list of the various roles in advance, place each part in a box, and ask the students to pick a role from the box – sight unseen.

Another writing assignment that integrates listening, speaking, reading and writing that appeals to the second language learners is writing poetry. Haikus for great for the beginners, and longer poems can be assigned for the intermediate or advance students. Writing Haikus is one of their favorite forms of poetry. It is easy to write a Haiku because they are short! Haiku poems consist of only 3 lines, the first line having 5 syllables, the second 7 syllables, and the third 5 syllables. This writing assignment is neither too short nor too long -- its just right.

Have your students brainstorm ways to celebrate the unit. Help them come up with good ideas, such as inviting a meteorologist to visit the classroom in connection with the weather study or preparing the *Sun Shake* recipe. Plan a school-wide daily weather announcement over the PA system. Display weather artwork made by the students. Second language learners love to show their creativity in their artwork.

A very good art project is making a “Weather Window.” The goal of this Weather Window is to remind the students that the weather changes every day. Invite the students to work on this special bulletin board and ask them to help you show these weather changes through the bulletin board display. The first step is to ask the students to draw scenes of their neighborhood showing how it looks in different kinds of weather. The teacher might assign each learner a particular weather condition so that the teacher has some variety to display. Be creative!

I also like doing an at-home project of making a wind chime. The objectives of this project are to show that the wind is strong enough to make things move, and in doing so it makes music! A parent or guardian at home can help the student.

Keep in mind that weather will be an important topic in the classroom for four weeks. The students will share some of the information at home as well. To help ensure success for the second language learners, the teacher and students might discuss weather conditions and reports daily. Encourage the learners to read fiction and non-fiction books that are weather-related, and let the student do weather hands-on experiments and projects.

Student assessment is an integral part of the unit. Create a teacher-made evaluation chart for the students. Use a chart to record students’ progress as they complete the weather portion of this unit. One way of assessing progress is to have the students take another look at their project and ask them to explain through writing and speaking the activity in their own words.

In making your own evaluation chart, you might ask a series of questions, such as: Was the weather unit an interesting topic to study? Did I learn a lot about the weather? You might have students complete a series of sentences such as:

- Something important I learned is \_\_\_\_\_.
- A weather book I read is \_\_\_\_\_.
- My favorite weather project is \_\_\_\_\_.
- Something I would like to know about weather is \_\_\_\_\_.

Lastly, I suggest parental involvement, as it will ensure enthusiasm and success of the theme unit. Send a letter home to the parents asking for their partnership. Parents can volunteer to tape or videotape your weather study in the classroom. For instance, make a video recording of student weather broadcasts or children performing or role-playing the meteorologist on television. Parents can also read aloud weather stories and legends to the class in their first language. They can help in making the weather instruments at home.

Remember that these activities and projects involve students in real-life tasks, the basis for authentic learning. Their purpose is not only to learn the English language, but also learn science and social studies. I hope that when you have selected this unit to do in your classroom, you and your students will have clear weather for clear sailing and plenty of sunshine as you teach about the weather by exploring this theme and integrate it in many other subject areas.

Enjoy this unit that integrates listening, speaking, reading, and writing as well as learning in the areas of reading, language arts, science, social studies, and art. The celebration at the end of the unit is the most awaited event for the second language learners, for the parents and the teachers.

## **CONCLUSION**

The final preparation for this curriculum has been written. I hope that as an educator I will continue to plan a curriculum that would meet the objectives of Science, Language Arts and ESL CLEAR. The weather topic is interesting because it relates to every subject area in my curriculum. The literature-based lessons with content mastery will enhance the students' learning.

In addition to science projects, the students will explore weather stories, poems, reading and responding to literature with weather-related themes, writing about weather, applying math concepts to weather studies, using social studies skills to understand weather, and creating weather tools, instruments, charts, maps, and crafts. At the end, to celebrate the unit, the students will probably create and perform a weather-based play.

Language competence and content mastery are essential to the second language learners because they need all these skills to be successful in the mainstreamed classes and pass the Reading, Writing and Math TAKS tests for the fourth graders. Thus, the unit's activities and projects involve second language learners in real-life tasks that are the basis for authentic learning. The unit will enable them to enjoy language learning and at the same time meet the TAKS objectives.

## **LESSON PLANS**

### **Lesson One: How to Launch the Weather Unit**

#### ***Objective***

Students will be able to listen and understand the poem.

Students will identify and become familiar with characteristic attributes of the four seasons, observe climatic changes, and predict weather patterns.

#### ***Activity***

1. Display the poster of Christina Rossetti's poem, "Clouds," and invite the students to listen as the teacher reads the poem.
2. Ask the following questions
  - a. What do you know about clouds?
  - b. What are the white sheep in this poem? [clouds]



- c. Why does the poet say the clouds are white sheep?
  - d. What makes the clouds move?
3. Next, point out the three different types of clouds and have students tell which kind looks most like the sheep described in the poem.
  4. Summarize what the students know about clouds and help them generate a list of what they would like to know.
  5. Finally, ask if anyone knows why clouds are important.

Guide the students in realizing that clouds are important indicator of weather. Reiterate that they will be learning about the answers to their questions about clouds and tell many other things about weather in the coming weeks.

6. In addition to the above activities, the children can listen to Judy Collins song, “I’ve Seen Clouds from Both Sides Now” and do a writing activity of creating their own songs for the advance learners or a class song.

Prepare the variety of materials and tap into as many resources as possible when doing this weather unit. Some of these resources could include: invite a resource person from the local weather station to visit the class or arrange a field trip for students to visit the weather station; check a variety of science textbooks for information on the weather; look for stories in students’ reading books that are relate to the weather theme; invite a meteorologist to share information and materials with your class; find films, tapes, video and other audio visual materials on weather; collect weather books for your classroom library; gather weather – related news stories and pictures from your local newspaper to display it on the bulletin board. And invite parents as resources for weather related jobs.

## **Lesson Plan Two: Weather/Literature: Flash, Crash, Rumble and Roll**

### ***Objectives***

The students will listen to the story and answer comprehension questions.

The students will be able to conduct experiment after reading the story to show that cold air and water are heavier than warm air and water.

The students will be able to write about their science experiment and make an oral class presentation with their partner.

### **Materials**

Clear container; hot and cold water; small bottle, food coloring, science journal

### **Procedure**

First, have one member of each team fill the container halfway with warm water.

Next, the other partner fills the small bottle with cold water and then adds a few drops of food coloring.

Tell the second partner to place a thumb over the mouth of the bottle and hold it sideways, lower it to the warm water, and then release the thumb.

The teacher asks: What happens to the cold water when it leaves the bottle? Why? Have the first partner record the steps and results in the science journal.

The teacher tells the students that they are going to reverse the experiment by filling the bowl with cold water and the bottle with warm water colored by food dye. Before doing this, ask the students to predict what will be the results.

The teacher tells the students that partners change assignments and do over the experiment as before, this time lowering the bottle all the way to the bottom of the bowl. The teacher asks: were your predictions correct? Why or why not?

Safety: The story includes safety tips on what to do when there is lightning. After reading and discussing the story to the children, have students make their own posters to educate others about the safety tips. Choose one or two tips to illustrate to avoid overcrowding. Display final product, the posters in the bulletin board outside the classroom.

### **Lesson Plan Three: *The Magic School Bus inside a Hurricane***

#### ***Objectives***

The students will be able to listen to the hurricane story and comprehend the given information.

The students will be able to explain that hurricanes are extreme weather form.

The student will discuss cause and effect of hurricanes.

The students will be able to define vocabulary words.

The students will be able to talk about safety precautions that people can take to minimize the risk of injury during a hurricane.

#### ***Content Words***

##### Set A

Temperature, weather, weather station, weather forecasters, atmosphere, troposphere, expands, molecules

##### Set B

Cirrus, stratus, cumulus, hurricane, hurricane watch, hurricane warning, warning, tropical storms, lightning, thunder, eye wall, evacuate, tornado

#### ***Build background***

Ask students to tell what they already know about hurricanes and the people that study them. Ask them if they have ever heard the term “storm chaser” and if so explain its meaning.

Create a KWL chart (what you Know, what you Want to know, and what you have Learned) on the board and fill in the first column with things students know about hurricanes. As a group, brainstorm some things students would like to know about the topic and fill in the second column.

#### ***Before Reading***

The teacher hand out the books and have the students read the title to make an informed prediction about the content of *The Magic School Bus inside the Hurricane*.

The teacher asks: What aspects of hurricane will you learn from the story?

#### ***Build background***

The teacher asks the students what they already know about hurricanes.

The teacher says and asks, “Share with the group what you already know about the hurricanes. Do you know what causes hurricanes?” Present children vocabulary words from the story and ask if there are any words they are unable to pronounce and which of the words do they already know the meaning of. Ask: “Which of the words are new to you?”

Have the children read the definition and discuss any word that they are still unclear about.

### ***During Reading***

Ask the children to turn to the first page and read it aloud. Discuss this page in relation to the drawing. Ask them why it is important to learn about the weather. What are the different sources of weather reports? Have children read the spelling words and discuss their meanings and use them in good sentences.

The teacher says that this is a book about an adventure that Ms. Frizzle and her class experience as they go inside a hurricane. Tell them to find out what makes wind as they read the story. Students should be able to define the “weather words” such as atmosphere, water vapor molecules, condensation etc.

### ***After Reading the Story***

Draw the class together to discuss the story. Say and ask: Share with the group how the class got into a hurricane. What makes hot air rise? After listening to the radio what is a hurricane watch? Ask questions related to the science information. The students should be able to tell about the hurricane watch, what happens during a tropical storm. What makes hurricane winds blow in a circle? Have the children work on the worksheet after reading the text.

### ***Science Connection Hands-On Activity***

Make a Twister in a Bottle

1. Fill a bottle  $\frac{2}{3}$  full of water.
2. Hold the bottle over sink.
3. Cover opening with one hand and turn bottle upside down.
4. Move bottle rapidly in a circle.
5. Stop circling take hand away from opening.
6. See twister in bottle as water runs out.

Have students write about the hands-on activity and present it orally in class.

### ***Writing Connection***

#### **Writing an Acrostic Poem**

The teacher explains what an acrostic poem is. It is having a word at the beginning of each line starting with the letters H-U-R-R-I-C-A-N-E. Work with the students to cooperatively write a model poem.

Have students work individually or with a friend to write and illustrate another acrostic poem.

### ***Social Studies Connection***

Have students use the library and the Internet to further research reported cases of extreme weather in different parts of the world. For example, floods, typhoons, etc. Invite the children to discuss the causes and effects of hurricane and to say how it affected the people concerned.

### ***Reading Independently***

Invite the students to reread the story, *The Magic School Bus inside a Hurricane*, independently or with a partner. They could also research for other books about hurricanes. The students should also read each other’s acrostic poem or present it to another class.

## **Lesson Plan Four: The Magic School Bus at the Waterworks**

### ***Objectives***

The students should be able to understand and answer comprehension questions.

The students should be able to use the reading strategy and asking questions to understand informational text.

The students should be able to identify main ideas and details.

### ***Content Vocabulary***

Waterworks, evaporates, water vapor, droplets, water cycle, reservoir, purify, clear water, chlorine, water pressure

### ***Before Reading***

#### **Build background**

Ask the students to tell what they already know about waterworks. Ask them if they have heard of the word, and if so, to explain its meaning. Find out if they know how our city gets its water. Do they know ten interesting facts about water? If they know ten interesting facts talk about it in class.

Create a KWL chart on the board and fill in the first column with things students know about waterworks and how our city gets its water. As a group brainstorm some things students would like to know about the topic and fill in the second column.

Give the students a copy of the book and have them examine closely the front and back covers and read the title. Have the students predict what the story is all about. Be able to introduce the strategy: Ask and answer questions.

### ***During Reading***

Read aloud *The Magic School Bus at the Waterworks* to the students. Tell them to listen to and find ten facts about water or how our city gets water. Also, tell them to look for facts about the waterworks that will answer their questions on the KWL chart.

### ***After Reading***

Ask students important information from the text. They can share questions and look for the answer as. The teacher asks what reading strategies help them understand and remember what they read.

Teach the comprehension skills, such as main ideas and details.

Instruct the students to use the inside front cover of their books to list one of the questions on the KWL chart that was not answered by the book. Have them tell what reference they might use to find the answer.

Have students summarize the text and complete the KWL chart. Give worksheets to check their comprehension.

### ***Science Connection***

Have the students explain the process of how our city gets its water.

Create a water chart.

Ask the students to illustrate the water cycle.

### ***Writing Connection***

Create colorful and attractive poster on how to save water.

## Home Connection

Give students their books to take home to read with parents, guardians, brothers, sisters or friends.

### ANNOTATED BIBLIOGRAPHY

#### Works Cited

Branley, Franklyn M. *Flash, Crash, Tumble, and Roll*. New York: Harper and Collins, 1985.

This book gives information about lightning and thunder with colorful and bright illustrations. The information is clear as well as the labeling that makes it appealing for children. It contains two weather experiments and a list of three Internet weather sites.

Cole, Joanna, and Bruce Degen. *The Magic School Bus in the Waterworks*. New York: Scholastic, 1995.

This is a children's book about Ms. Frizzle, a science teacher, who drives the magical school bus into a cloud where her students were transformed to the size of water droplets and went through the city's waterworks.

---. *The Magic School Bus Inside a Hurricane*. New York: Scholastic, 1986.

This is a children's book about Ms. Frizzle, a science teacher who takes her class for an adventure inside the hurricane. First the magic school bus transforms into a hot air balloon and a weather plane so that Ms. Frizzle and her students can travel to the clouds to get to the hurricane. The story combines science and fantasy so that the students can learn about hurricanes and the weather.

Collins, Judy. *Both Sides Now*. 1998. Intersound Record.

The album is a collection of Judy Collin's favorite folk songs. Listen to the lyrics of the song "Both Sides Now," that relates to the lesson on "clouds."

Decker, Robert, and Barbara Decker. *Volcanoes (3<sup>rd</sup> Edition)*. New York: W.H. Freeman and Company, 1998.

Dr. Seuss. *The Lorax*. New York: Random House, 1971.

This is a children's book about greed and destruction. The main character named the Once-ler describes the results of the local pollution problem. For the big unit, this book will be one of the three literature books that will be used for the read aloud.

McCullough, David. *The Johnstown Flood*. New York: Simon and Schuster, 1987.

Mc Millan, Bruce. *The Weather Sky*. New York: Farrar, Straus and Giroux, 1996.

For upper and middle elementary kids covers all the basics of weather. It has wonderful and colorful illustrations of moving air masses, highs and lows, fronts and cloud formations.

Rossetti, Christina. "Clouds." *Sing a Song of Popcorn*. New York: Scholastic Books, 1988.

This book gives information on the three different types of clouds. The poem can be use to launch the Weather Theme.

*Tropical Storm Allison Recovery Project (TSARP)*. FEMA and Harris County Flood Control District. 2005.

<<http://www.tsarp.org>>.

This website gives us good information about Tropical Storm Allison. TSARP is a joint study effort of the TSARP by the Federal Emergency Management Agency and the Harris County Flood Control District (the District). The goal of the project is to help the community to recover from the devastating flood and flood risks. It also provides information on flood insurance rate maps and the areas where floods will most likely occur.

Wolfe, Richard W. *The 1991 Eruption of Mount Pinatubo in the Philippines*. 1992.

<<http://pubs.usgs.gov/pinatubo/wolfe/index.htm>>.

Scientists compiled this comprehensive report of Mount Pinatubo's overview and historical background.

#### Supplemental Resources

*Dynamic Earth*. Discovery School. 27 Mar 2005.

<<http://www.school.discovery.com/lessonplans/programs/dynamicearth>>

This is a website where teachers can find science lessons plans that are related to the weather.

*Fresh Water*. <<http://www.mobot.org/MBGovt/fresh/index>>.

Various lessons and teacher information can be found in this website.

*Great Weather Related Photos*. <<http://www.photolib.NOAA.gov.html>>

This website shows photos of storm locations and weather related photos.

*The Magic School Bus*. 06 Feb. 2005. <<http://www.place.scholastic.com/magicschoolbus/index.html>>  
The Magic School Bus website offers teachers lesson plans and suggestions to make learning fun. Find Joanna Coles popular books such as *The Magic School Bus in the Waterworks* and *The Magic School Bus inside the Hurricane*. Good teacher materials are found in this website.

*Tropical Storm Allison – June 4-18, 2001*. 2001. 28 Mar. 2005.  
<<http://www.hpc.ncep.noaa.gov/tropical/rain/allison2001.html>>  
This website is a good source of information. It describes the events during and after the Tropical Storm Allison.

“Water Cycle.” *The Water Cycle at Work*. U.S. Environmental Protection Agency.  
<<http://www.epa.gov/OGWDW/kids/cycle>>  
Different fresh water sources, water cycle, aquatic plants and water pollution information is found in this website.

“Water Cycle Experiment.” *The Simple Water Cycle Experiment*. U.S. Environmental Protection Agency.  
<<http://www.epa.gov/OGWDW/kids/tuar.html>>.  
This website provides good and simple water cycle experiments.

“Weather.” *Columbia Electronic Encyclopedia*. 6<sup>th</sup> ed. 2005 Pearson Education 27 Mar. 2005.  
<<http://print.infoplease.com/ce6/weather/A0851700.html>>.  
This website gives a lot of information about the weather.

*The Weather Book*. June 22, 2001 (last updated). <<http://www.crh.noaa.gov/mkx/owlie/owlie.html>>  
Owlie Skywarn’s weather book teaches about the hazards of severe weather that include lightning, hurricanes, flashfloods and weather forecasts.

Website presented in the TV show *The Magic School Bus Fun Place*.  
<http://www.place.scholastic.com/magicschoolbus/index.html>  
Various lessons and teacher information can be found in this website.

## **Films**

*The Magic School Bus at the Waterworks*. New York: Scholastic, 1995.  
This is a children’s film about Ms. Frizzle, a science teacher, who drives the magical school bus into a cloud where her students transformed to the size of water droplets and went through the city’s waterworks.

*The Magic School Bus inside the Hurricane*. New York, NY Scholastic, 1986.  
This is a children’s film about Ms. Frizzle, a science teacher who takes her class for an adventure inside the hurricane. First the magic school bus transforms into a hot air balloon and a weather plane so that Ms. Frizzle and her students can travel to the clouds to get to the hurricane. The story combines science and fantasy so that the students can learn about hurricanes and the weather.