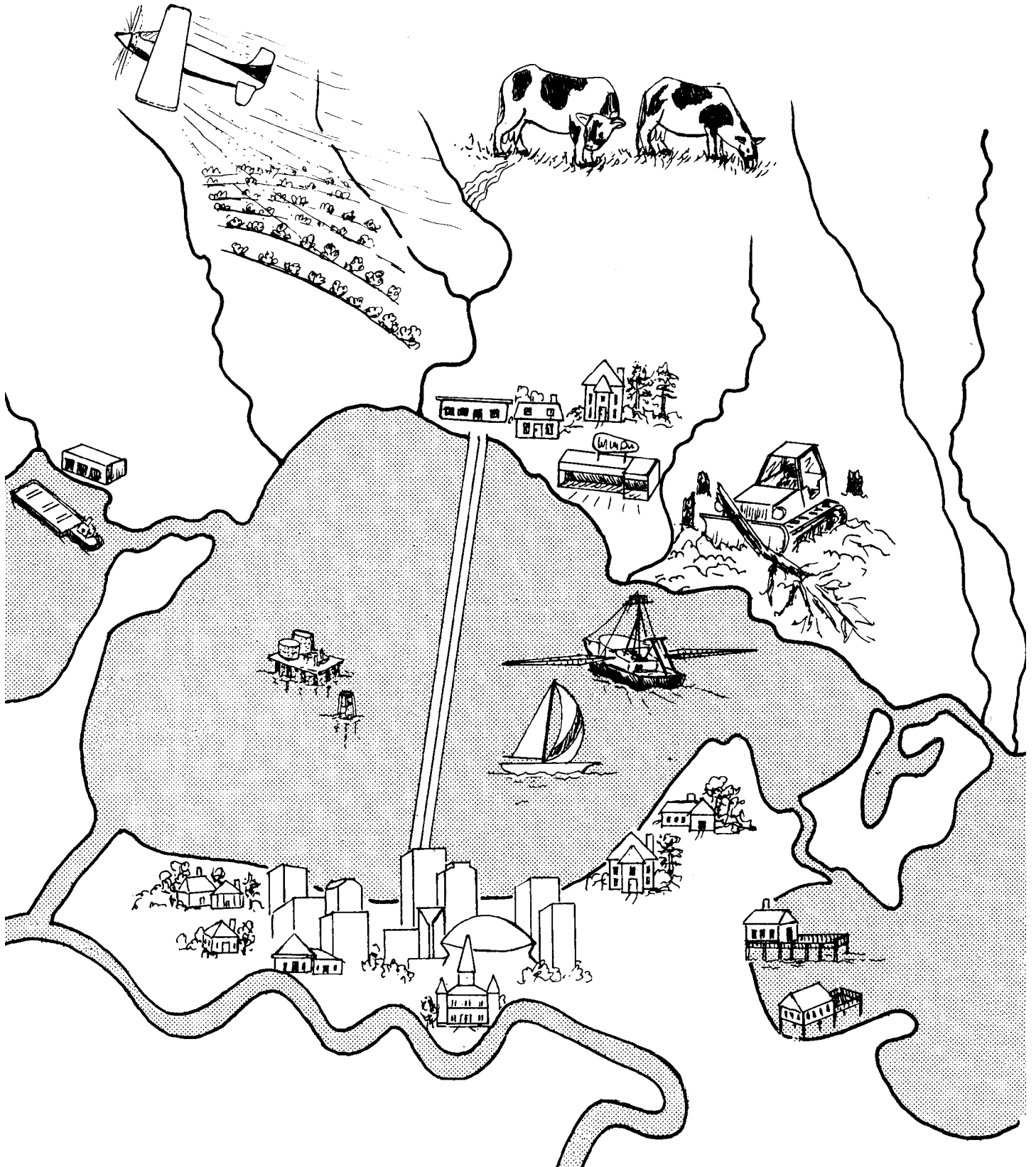


# 1. LAKE PONTCHARTRAIN BASIN: A Watershed



# Essential Questions:

WHAT IS A WATERSHED?

WHERE DOES THE WATER IN THE WATERSHED COME FROM, AND WHERE DOES IT GO?

WHAT CAN I LEARN ABOUT THE WATERSHED FROM MAPS?

WHY SHOULD I TOUR THE LAKE PONTCHARTRAIN WATERSHED?

LAKE PONTCHARTRAIN BASIN:  
**A Watershed**



OBJECTIVES :



- Define a watershed.
- Describe the relationship between land and water in the watershed.
- Describe the Lake Pontchartrain Basin watershed.
- Read and understand the features on a topographic map.

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MULTIPLE INTELLIGENCES LEARNING ACTIVITIES :

*Verbal/Linguistic:* Write a script promoting the Lake Pontchartrain Watershed.

*Logical/Mathematical:* Construct individual maps of the Lake Pontchartrain Basin.

*Visual/Spatial:* Design a watershed and demonstrate its function.  
Create posters and programs to publicize and promote the Lake Pontchartrain Watershed.

*Bodily/Kinesthetic:* Dramatize a trip through the Lake Pontchartrain Watershed.

*Interpersonal:* Work in cooperative groups designing a watershed, conducting a survey, and writing, promoting, and producing a play.

*Intrapersonal:* Verbally express feelings about the Lake Pontchartrain Basin after listening to a guided imagery.

*Naturalist:* Participate in a volunteer litter cleanup; conduct watershed symposium; visit a site and/or Internet web site using senses to observe; collect data from observations; document changes in nature; organize information in a comparative study of watersheds locally, nationally, and/or globally.

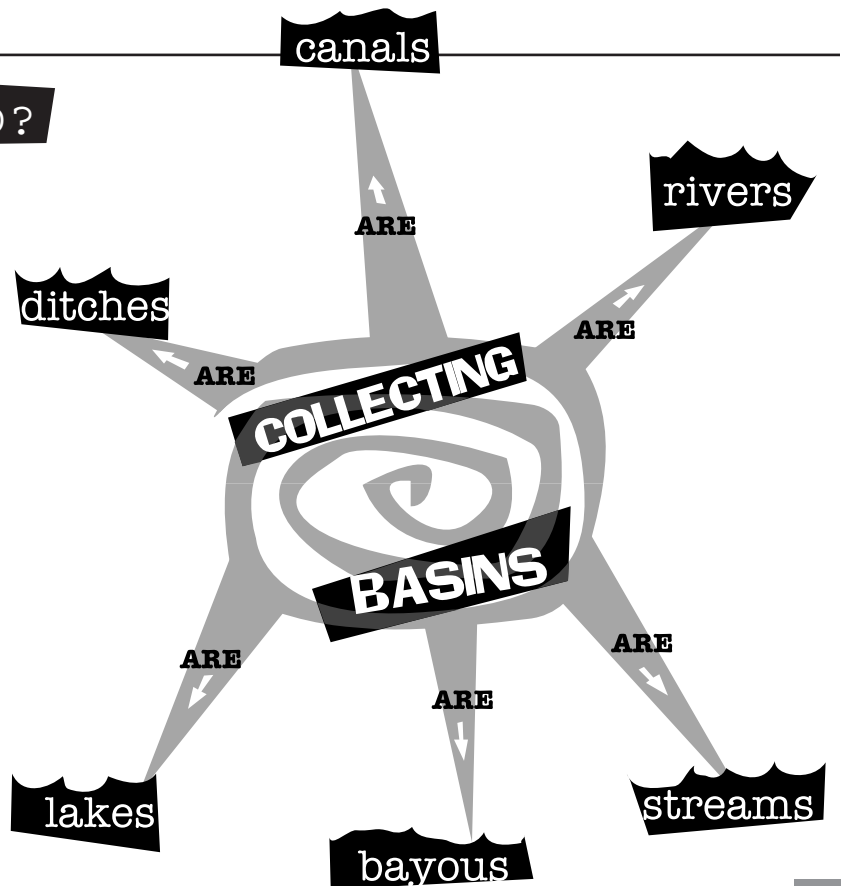


## FACTS ABOUT THE LAKE PONTCHARTRAIN BASIN

- Another name for the Lake Pontchartrain Basin is the **Lake Pontchartrain Watershed**.
- The Basin, or watershed, is home to 1.5 million people.
- The watershed drains the land in 16 Louisiana parishes and 4 Mississippi counties.
- The Louisiana parishes in the Lake Pontchartrain Watershed are: Ascension, East Baton Rouge, East Feliciana, Iberville, Jefferson, Livingston, Orleans, Plaquemines, Tangipahoa, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Helena, St. Tammany, and Washington.
- Lake Pontchartrain, formed 5,000 years ago, is the largest feature of the Lake Pontchartrain Basin.
- Lake Pontchartrain is not a lake; it is an **estuary**, or an area in which fresh water from rain and rivers measurably dilutes the salt water from the Gulf of Mexico.
- Lake Pontchartrain is an entire ecosystem with great biodiversity. An ecosystem is made up of all the living and non-living components of the environment.

### WHAT IS A WATERSHED?

- A watershed is the total land area that contributes runoff to a specific body of water.
- The runoff is the water which flows off the land surface.
- The elevation and slope of the land determines which way the surface water will flow.
- The lowest areas in the watershed that act as collecting basins include rivers, bayous, canals, ditches, streams and lakes.



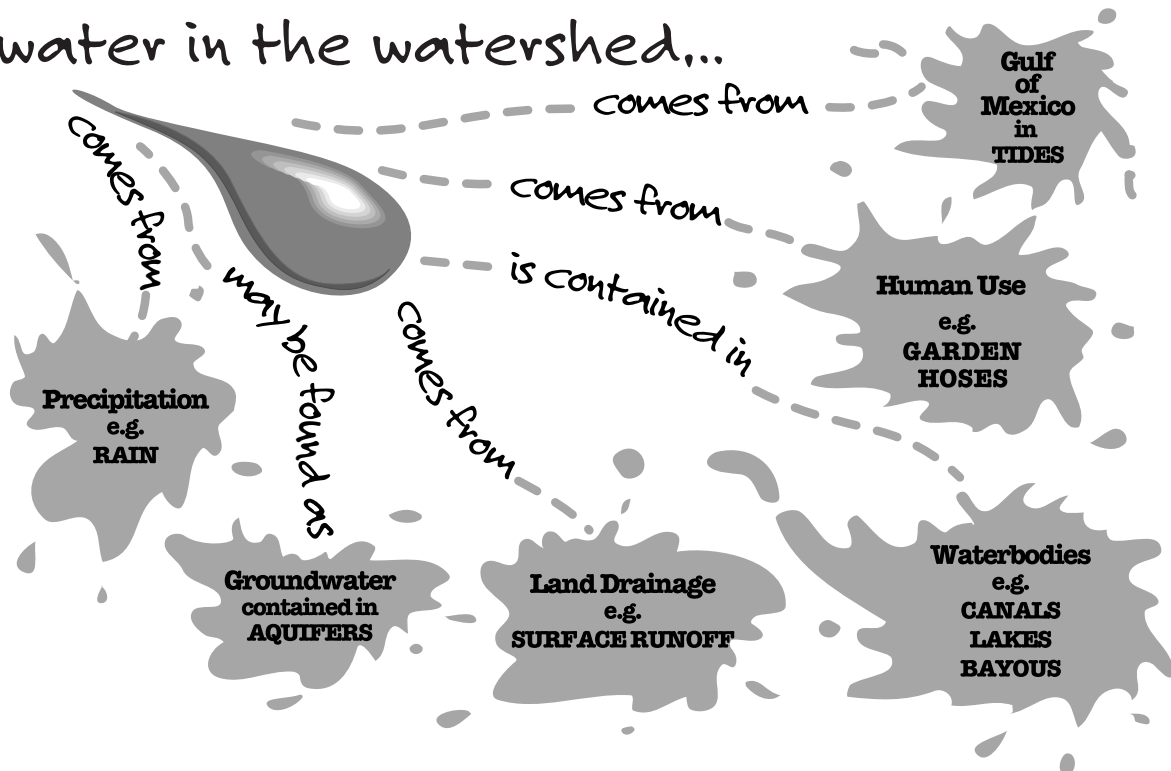
## LAKE PONTCHARTRAIN BASIN

The Lake Pontchartrain Basin is a large watershed covering 4,700 square miles. In Louisiana the northern border is the Louisiana/Mississippi state line. The Basin continues south to the Gulf of Mexico along the east bank of the Mississippi River. The western border of the Basin is the east bank of the Mississippi River, and the eastern boundary is the Pearl River from Washington Parish to Breton Sound.

*\*Refer to map of The Lake Pontchartrain Basin (Appendix A)*

### WHERE DOES THE WATER IN THE WATERSHED COME FROM?

The water in the watershed...



- **Precipitation:** Precipitation may be in the form of excessive rainfall events or normal rainfall up to 60 inches per year. Other forms of precipitation include sleet, freezing rain, or light snow.
- **Groundwater:** Groundwater infiltrates or percolates from surface waters, surrounds sediment particles, and filters through the soil. Trapped groundwater may collect in aquifers, or it may move to the surface by way of wells drilled into aquifers or by seeping from springs.
- **Land Drainage:** Precipitation may land on non-absorbent surfaces. This surface runoff drains to lower areas from the streets, down the storm drains, and eventually gets pumped into the lowest area, Lake Pontchartrain.
- **Waterbodies:** Canals, lakes, and bayous are some of the water-collecting areas that hold and funnel water in and out of the watershed.

- **Human use:** Each person uses approximately 100 gallons of water each day. This water is brought from a water source by pipes. Careless actions by citizens, however, often allow water that is intended for human use to become surface runoff. Examples include open or leaky faucets and old cracked pipes.
- **Gulf of Mexico:** Waters from the Gulf of Mexico move in and out of the Lake Pontchartrain area on each high and low tide and are blown in by strong easterly winds.

# How does precipitation affect the watershed?

The water from rain runs off the land after heavy rainfall or small showers. This rainwater reaches the surface of the earth and enters the water cycle.

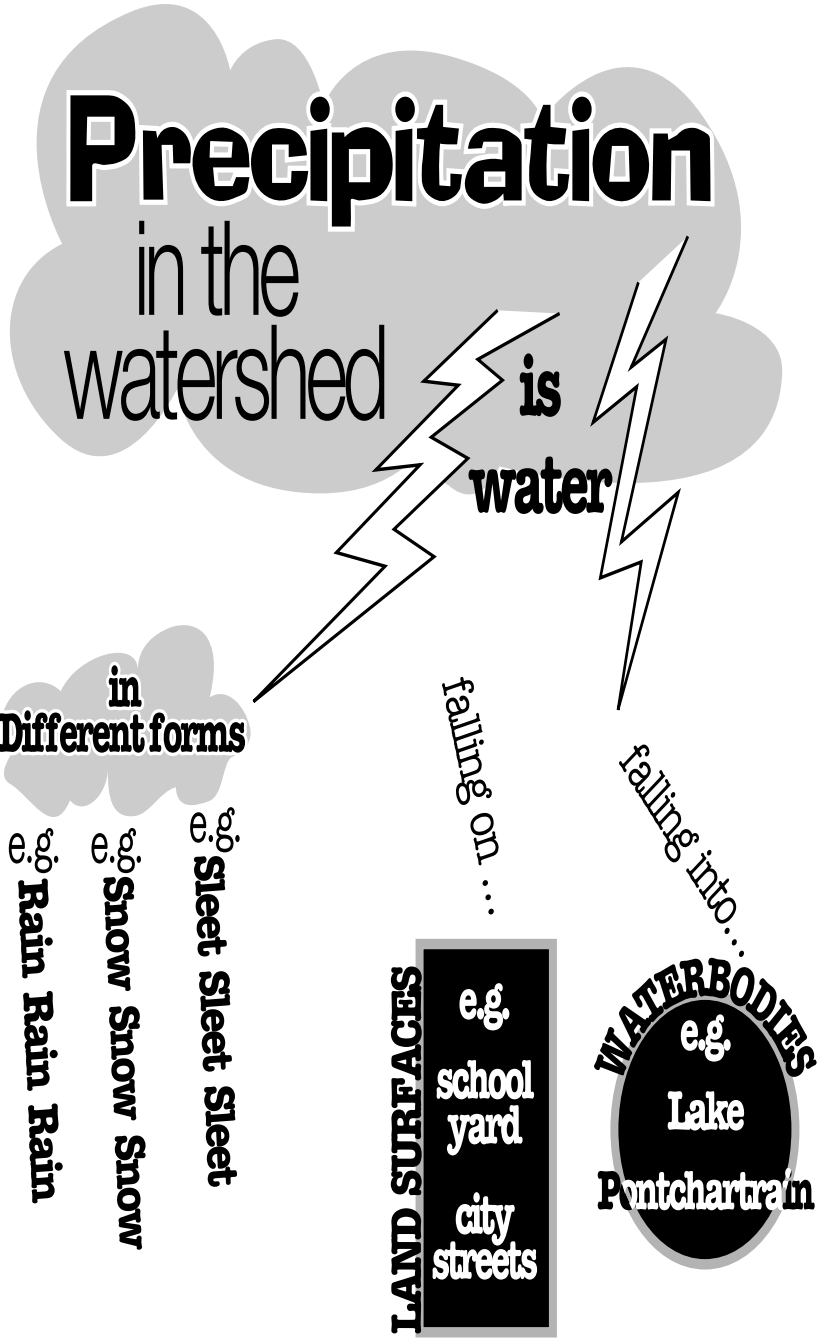
The water cycle is an exchange of water molecules through the processes of evaporation, condensation, infiltration and precipitation.

Evaporation is the loss of water molecules from the land surface and waterbodies. It supplies the moisture in the atmosphere.

This moisture content is known as humidity.

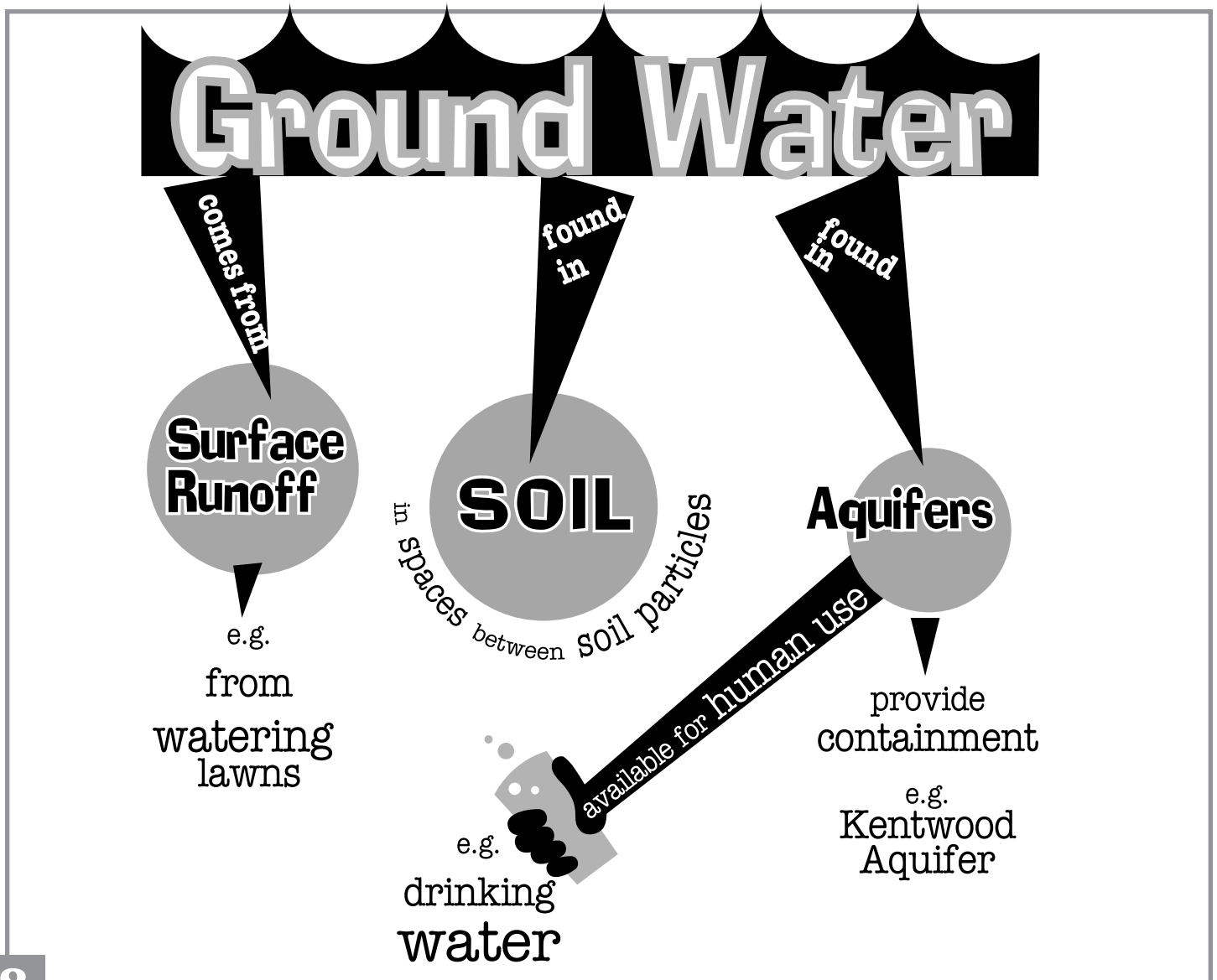
Moisture droplets gather together in the atmosphere where they condense around particles of dust or other substances.

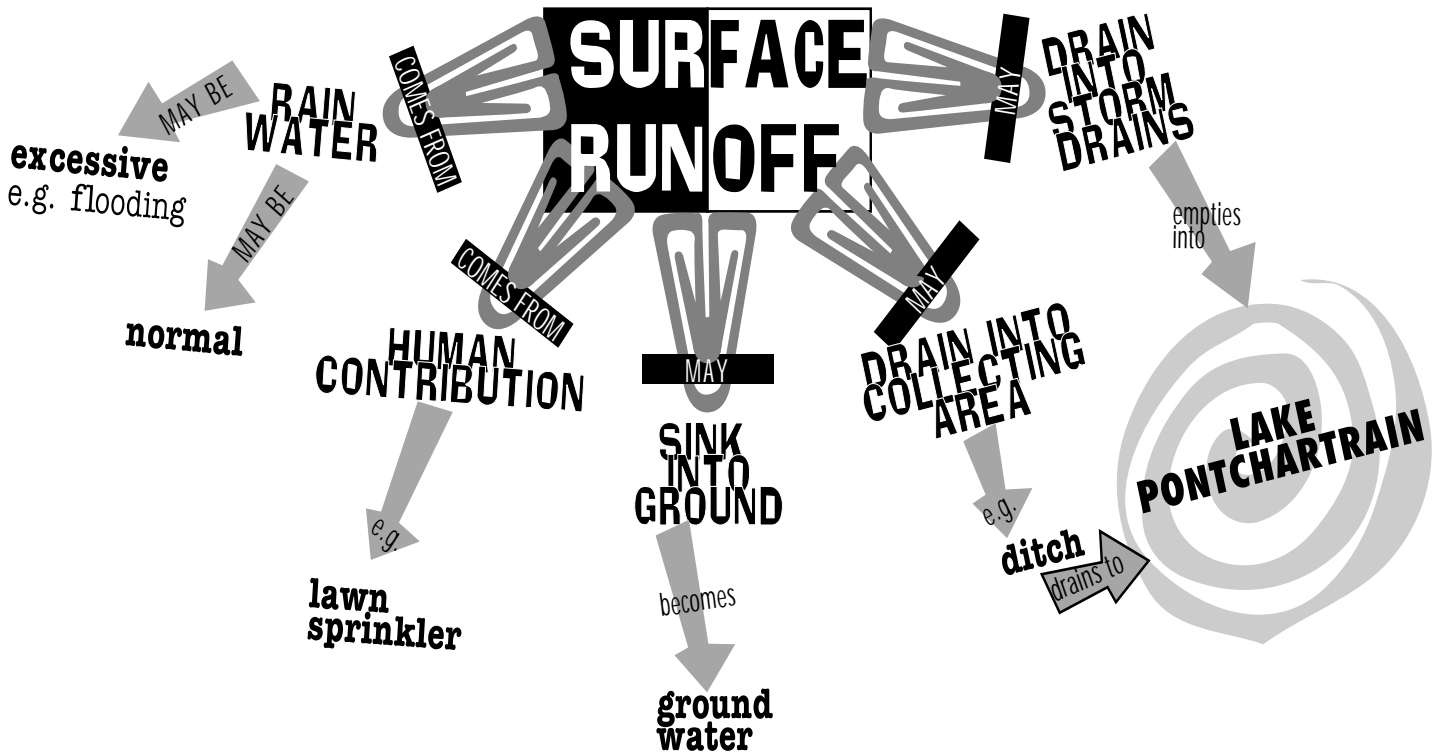
Droplets become heavy, and eventually precipitation (rain) occurs.



# HOW DOES GROUNDWATER AFFECT THE WATERSHED?

- Precipitation soaks into the ground and becomes **ground water**.
- Surface water filters through soil and rock before reaching an aquifer.
- Water in the spaces/openings surrounding soil particles (*interstitial*) is used for the biological needs of many plants and animals.
- Aquifers are impounded or enclosed areas which hold the water underground. Many aquifers are tapped by communities for drinking water. Surface waters that become contaminated or polluted may seep into underground aquifers, deteriorating the quality of the water in the watershed.





## HOW DOES SURFACE RUNOFF AFFECT THE WATERSHED?

- Surface runoff is water that either does not have time to sink into the ground or is produced in such quantity (e.g., floods) that the normal soaking-up process cannot take place.
- Water in the form of precipitation runs off the land surface from either grass, soil, or paved areas.
- The runoff may also drain from open hydrants or hoses.
- Surface runoff, either from the “first flush” (the first inch of a heavy rainfall) or from water draining for a longer time (e.g., a garden hose) carries pollutants, such as motor oil or pesticides, to the waterbodies in the watershed.
- Responsible actions on the part of citizens can prevent contamination in the watershed. For example, each of us could recycle used motor oil, pick up pet wastes, and properly use pesticides, fertilizers, and herbicides.

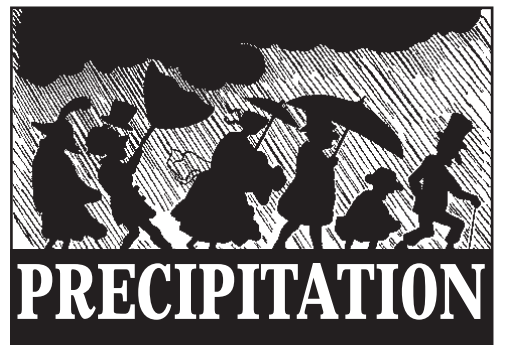
ACTIVITY :  
**Water in the Basin**

**Materials:**

- Large piece of visquine plastic  
(*painter's drop cloth*)
- Red, unsweetened Koolaid® or  
powdered drink mix
- Watering can with small holes in the spout
- Water

**Process:**

1. In a large relatively flat area inside or outside the classroom, unfold and spread out the painter's drop cloth.
2. Ask the students to pretend that the painter's drop cloth is part of the Lake Pontchartrain Watershed. Ask them to describe what would happen if it suddenly started to rain. (*The drop cloth will collect water like the land does in the Lake Pontchartrain Watershed.*)
3. Ask the students to predict where the water from the rain would go on the drop cloth. (*If the drop cloth is relatively flat, the entire surface may collect droplets of water; if there are any elevations and low places, the water would be seen at the lowest spot.*)
4. Ask the students to use objects in the classroom or on the playground to build ridges and low spots in their watershed. Place objects of different shapes and heights under the drop cloth.
5. Ask students to choose a spot on the drop cloth which will collect the water. Students may decide to make streams or rivers in their watershed. Have a collecting apparatus such as a bucket nearby if you are in a classroom or use absorbent material such as sponges to soak up water.
6. Sprinkle Koolaid® all over the watershed area. Designate a student to "rain" on the watershed by gently sprinkling it with the water can. Other students should be designated "observers," watching what happens when it rains in the watershed.
7. Ask students to construct a sequence of events chart to describe their observations. An example of a completed sequence of events chart is "Precipitation" (at the top of this page).



Rain Wets Land Surfaces

Water Runs Into Ditches

Ditches Drain To Canals

Canals Drain To  
Lake Pontchartrain

**Extension:**

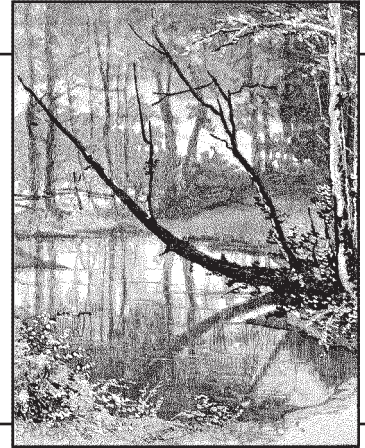
*Ask students to study the shape of the Lake Pontchartrain Watershed. After careful study, students could construct a model of the Lake Pontchartrain Basin using the painter's cloth.*

TRAVELIN THROUGH THE BASIN

Activity: Guided Imagery

Materials:

- Tape player
- Nature music
- Index cards



Process:

- 1 Practice reading the Tangipahoa River guided imagery passage (Page 3) aloud before reading it to the students.
2. Play a nature tape with sounds of the wetlands, water, or forest as background music.
3. Make sure the room is quiet and free of distraction.
4. Direct the students to sit comfortably, close their eyes, and feel the mood of the imagery presented.
5. Quietly say, *“Close your eyes and relax....empty your mind of all of the concerns of the day and listen only to the sound of my voice and the sounds of nature....disregard all other sounds and senses and relax....take a deep breath and relax....feel the tension flowing from your scalp....feel the tension flow from your jaw muscles....relax your neck muscles.... take a deep breath and relax....lower your shoulders....let your arms go limp... relax your legs.... your toes....take a deep breath....I am going to read a short passage to you, and I want you to listen carefully with all of your senses. Listen for sounds.... visualize the images....feel the feelings and emotions....inhale the aromas....and imagine the textures.”*
6. After reading the guided imagery, quietly instruct the students to *“Take a few deep breaths and slowly bring yourself back to the classroom...take your time and open your eyes when you are ready.”*
7. Encourage the students to express and share feelings inspired by the guided imagery. A nonthreatening way to elicit feelings is to give students a plain index card and ask them to write down their feelings about selected images. Collect the cards, shuffle them, read, and explore the emotions with the whole group of students.

Extension:

- Write a poem about the guided imagery. Use poetry forms like *syntu, haiku or cinquain.*
- Draw a picture to represent what you envisioned during the guided imagery.

ACTIVITY:  
**Learning about the Basin**

**Materials:**

- Handouts of *Cartographic Information* for each student (Pages 14-15).
- Transparency of the *Watershed Map of the Lake Pontchartrain Basin (Base map)*. Refer to Appendix A.
- Handout of the *Watershed Map of the Lake Pontchartrain Basin* for each student. Refer to Appendix A.
- Transparencies of the features of the Lake Pontchartrain Basin (*elevation, vegetation, soil, cultural, historical, land use, rainfall, and geologic formations*). Refer to Appendix A.
- 8 Louisiana road maps
- Butcher Paper; Markers; Pictures

**Procedure:**

- 1 Distribute and review the handout *Cartographic Information*.
- 2 Place the transparency of the *Watershed Map of the Lake Pontchartrain Basin* on an overhead projector, and sequentially lay each of the following eight transparencies over the base map. Identify the basic features and discuss with the students what new information is added to the base map. Add color to transparencies for more impact.

**Features:**

- |  |                       |
|--|-----------------------|
| ➊ Elevation ( <i>high to low</i> )           | ➋ Historical          |
| ➌ Vegetation ( <i>forest, swamp, marsh</i> ) | ➍ Land use            |
| ➎ Soil ( <i>types</i> )                      | ➏ Rainfall            |
| ➐ Cultural                                   | ➑ Geologic formations |

**Discussion Questions:**

- *What does this added information tell you about the area?*
- *How is this related to other information given?*
- *How would you find this information if you did not have a map?*
- *What is the connection between soil types and vegetation?*
- *What is the connection between geologic formations and elevations?*

- *Where would you expect to find cities?*
- *Is there any connection between where cities are built and where elevation, vegetation or specific soils are found?*
- *Where would you build roads?*

3. Divide the class into small groups of three or four students. Give each group of students a current road map of Louisiana. Ask them to focus their attention on the Lake Pontchartrain Basin area. (You may even have them mark this area on their map).

### **Discussion Questions:**

- *What is the map scale of the road map?*
- *How is this map different from the map presented on the overhead?*
- *What additional information does this map contain?*
- *What information was presented earlier that was not contained in the road map?*
- *What use or purpose would the two maps have? Are they the same or different?*

4. Distribute the *Watershed Map of the Lake Pontchartrain Basin*. Direct each group of students to construct a map of the Lake Pontchartrain Basin. They may consult their road maps and the transparencies for additional information. Students may use their own symbols for places or things in the Basin. A map may focus on a theme, e.g., camping, swimming spots, types of seafood, or even restaurants!

## **ASSESSMENT QUESTIONS:**

### **Map:**

- *Does the map communicate a main idea or theme?*
- *Is the map visually appealing?*
- *Does the map contain all of the typical elements, such as map scale, contour lines, rivers, elevation, etc.?*
- *Are all the features clearly indicated?*
- *Are there any creative or individualized elements in the map, such as birthplaces, favorite fishing spots, schools, etc.?*

CARTOGRAPHIC INFORMATION:  
**What you need to know to make a map**

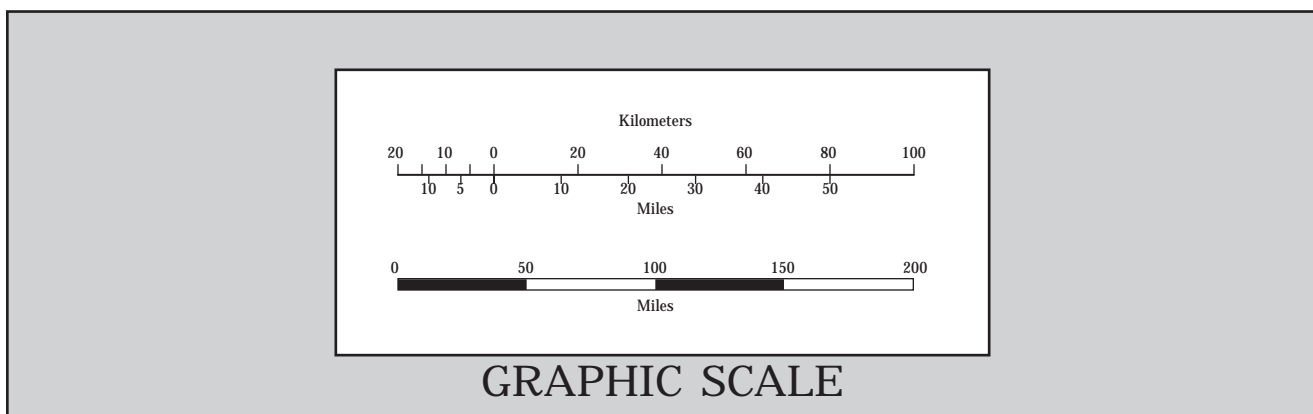
**Scale:**

**Representative Fraction**

- A representative fraction may be written 1:500,000.
- The numerator is always 1 and represents a unit of distance on the map.
- The denominator is a greater number than the numerator and represents units of distance on the ground.
- Units of distance represented in numerator and denominator are always the same units, i.e. miles or kilometers.
- In a small scale map, features are small and generalized.
- In a large scale map, features are more detailed but less area is seen.

**Graphic Scale:**

- The graphic scale is a symbol which appears as a small ruler printed on the margin of the map.
- The scale is divided into increments starting with 0 or 1. Each increment will indicate the unit in miles, yards, or kilometers.
- Each increment may be divided into smaller increments in order to give a more accurate reading.
- Map scales are usually in miles or kilometers.


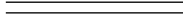




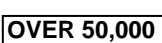
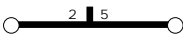


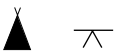







**To measure actual distances  
on the ground from information given on a map:**

- Use a ruler, protractor, or piece of string to measure the distance between two points on the map.
- Take a reading of that distance on the map scale at the bottom of the map to figure out the actual distance.

## Legend:

Information in the legend will vary with the map. All road maps will include some of the following symbols or information:

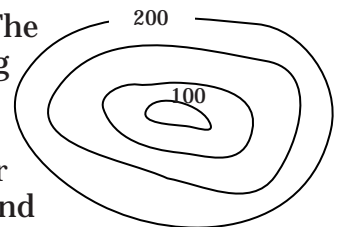
	
	
	highways, roads, trails
	
	railroad, bridges, tunnels
	
<b>MONROE</b> 	population symbols
	distance between towns and junctions
	total miles between cities
	wildlife areas, game refuges, national forests and parks
	state parks, campsites, recreational areas, boat launches
	state capitol
	tourist areas
	state, county, and national boundary
	land types such as marsh, swamp, etc.
	other points of interest

## Symbols:

Maps may use a number of other icons as symbols, such as dots in different sizes to indicate population size of cities. Check your road map for notations of symbols and their designation.

## Contour Lines:

On topographic maps, elevation is indicated by contour lines. The contour-line system is the use of imaginary horizontal planes cutting through the vertical features of the earth's surface. Imagine that we had an exact model of the state of Louisiana, one that we could look at from every angle. If we decided to cut horizontally into it at regular intervals from the highest point, we could then look at each section and transfer that information to a topographic map. Each contour line closes on itself and represents lines of equal elevation.



## Contour Interval:

This information is given on the topographic map itself. Each vertical interval is the same, i.e. 50 feet or 5 meters. These vertical intervals are much like the rise of a step, one above each other. All contour intervals start with sea level as 0. As the contour interval number increases, the terrain is more elevated. Contour lines which are close together indicate steep slopes. Contour lines which are far apart indicate gentle slopes. Check the bottom of the map for contour line intervals.

ACTIVITY:  
**Travelin' Troupe**



**Materials:**

- Paper
- Colored markers
- Construction paper
- Props for actors

**Procedure:**

1. Divide the class into groups of four to five students.
2. Each small group will become a "Travelin' Troupe" touring through the Lake Pontchartrain Watershed. Troupes in times past were costumed actors/acresses who acted out plays that informed and entertained audiences. The Troupe's charge is to promote the Lake Pontchartrain Watershed as a tourist attraction having unique and exciting features and abundant plants and animals.
3. Each Troupe must develop:
  - a script promoting the Lake Pontchartrain Watershed;
  - a promotional poster to advertise their "performance;"
  - a program for the "performance," and
  - a "Participation in the Basin" survey for the audience.

**Sample Survey Questions:**

- *In your lifetime, what major changes have you witnessed in the Lake and surrounding areas?*
- *Did you ever swim in the Lake?*
- *Do you use the Lake for boating, crabbing, or fishing?*
- *Have you read any information in the newspaper about the Lake?*
- *Have you participated in a Lake clean-up?*
- *What do you do at your home that influences the water quality of the Lake?*

4. Troupes may choose to emphasize the cultural, geologic, biologic, or geographic features of the Lake Pontchartrain Watershed. They must, however, include a variety of sites or features.

5. Troupes will:

- perform a script that they write, e.g., a travelogue;
- give a formal oral presentation like a panel discussion, and
- perform a creative dance or write a song about the sites chosen, e.g., Native American sites along the shores of the Lake.

## ASSESSMENT QUESTIONS:

### Poster:

- *Is it colorful? Is it legible? Does it provide accurate information? Does it grab/draw the viewer's attention?*

### Program:

- *Does it clearly and completely outline and describe the performance? Is it well organized? Is creativity exemplified through novel, unique, or original elements?*

### Survey:

- *Is it well organized? Is there a clear focus? Does it provide useful information? Does it allow the participants to voice concerns/interests about the Basin?*

### Presentation:

- *Is it well organized? Are the participants articulate? Do the participants present useful information? Do the participants use visual aids?*

### Extensions:

- *Ask the students to plan a trip with their families to various locations in the Lake Pontchartrain Watershed.*
- *Encourage the students to create a photojournal of the Lake Pontchartrain Watershed.*
- *Ask the students to keep a journal while researching this project. Entries may include memories, questions, wishes, plans.*
- *Display and share the theme maps made in the previous activity with family, friends, or others. Request other ideas about maps for the Lake Pontchartrain Watershed.*

ACTIVITY:  
**Surfin'**  
the Basin... and Beyond!

**Objectives:**

- 1 Use the Internet to research a local watershed.
- 2 Collect data and pertinent information about the watershed.
- 3 Make observations and inferences about the watershed.
- 4 Compare and contrast your local watershed with other watersheds in the state, country, and world.
- 5 Communicate findings of the comparative study at a student-directed Watershed Symposium.

**Teaching Materials:**

- Computer with Internet provider
- Copies of "Surfin' the Basin...and Beyond!" Handout (Page 20)
- Paper
- Pencil
- Butcher paper or easel tablet
- Markers
- Overhead projector and transparencies (if required)
- Power Point or other computer presentation program (if required)

**Getting Ready:**

- 1 Familiarize yourself with the website: [www.epa.gov/surf2/](http://www.epa.gov/surf2/).
2. Organize students into cooperative learning groups, if desired.
3. Be sure that students are familiar with use of the Internet.
4. Describe parameters of the research project, comparative study, and Watershed Symposium for students.

*Note: Here is one example of a comparative study chart. Adapt yours to meet the needs of your class.*

	WATERSHED 1	WATERSHED 2
Location		
Land use patterns		
Landforms		
Water quality		

5. Prepare watershed assignments for student groups. All student groups will research the Lake Pontchartrain Basin. Assign each group another watershed in Louisiana and another watershed in the United States for their comparative study.

### **Procedure:**

- 1 Working alone or as part of a cooperative learning group, follow instructions on the “Surfin’ the Basin...and Beyond” handout.
- 2 Report findings of the comparative study in an audiovisual presentation.

### **Extensions:**

- ① *Have students develop a Power Point or other computer presentation program to present their watershed comparative study.*
- ② *Conduct the Watershed Symposium for other classes, parents, and/or guests of the class.*
- ③ *“Watersheds of the World” is an excellent topic for a symposium if students extend their study beyond the United States to other countries.*

### **Assessment Procedures:**

- ① Use the rubric provided to assess student comparison of watersheds.
- ② Students may also use the rubric to conduct a peer assessment of their projects.





# Surfin' the BASIN and Beyond! Rubric

	RESEARCH	COMPARISON/CONTRAST	PRESENTATION	PERFORMANCE
	Degree to which the local watershed is researched on the Internet	Degree to which the local watershed is compared & contrasted with another watershed	Degree to which the presentation is organized and prepared	Degree to which the presentation contributes to the Watershed Symposium
<b>A Excellent:</b> Research, analysis, and presentation are professional.	All salient facts are accurate and present. Comprehensive Internet research.	Watersheds are compared/contrasted on all significant attributes.	Presentation is logically and effectively organized. Audiovisual materials are excellent.	Presentation is very professional and informative. The speaker is well prepared and interesting.
<b>B Good:</b> Research, analysis, and presentation are at the apprentice level.	Most salient facts are accurate and present. Fairly comprehensive Internet research.	Watersheds are compared/contrasted on most significant attributes.	Presentation is organized. Audiovisual materials are good.	Presentation is professional and fairly informative. The speaker is prepared and fairly interesting.
<b>C Fair:</b> Research, analysis, and presentation are at the novice level.	Some salient facts are accurate and present. Research on Internet is superficial.	Watersheds are compared/contrasted on some significant attributes.	Presentation is somewhat organized. Audiovisual materials are fair.	Presentation is amateurish and barely informative. The speaker needs more preparation of materials and in delivery.
<b>D Needs improvement:</b> Research, analysis, and presentation are at the "looking for a job" level.	Where are the salient facts? Where is the Internet research?	What are the attributes? Where is the comparison/contrast?	Where is the organization? Where are the audiovisual materials?	Where is the information? Where was the preparation? Delivery needs work.