

## Whose River Is It - Debate

**Essential Question:** What are solutions for addressing concerns related to the watershed?

**Objective:** Students will debate solutions for addressing concerns related to the watershed using reference materials.

### Next Generation Sunshine State Standard(s):

SC.6.N.1.1

Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.6.N.1.5

Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.

### Next Generation Science Standard(s):

MS-ESS3-3

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-ETS1-1

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

**Materials:** (one for each student)

- copies of text/visual resources from Lessons 1 through 4
- white boards
- easels
- markers

**Set up / prep:** Make copies of scenario and reference resources

**Time needed:** 50 minutes/one class period

### Procedure:

1. Students will be working in groups of four.
2. Instruct students they will be choosing a position to support in response to the following question:
  - a. Which group's (Pro-Dairy Farmers or Pre-River Citizen's Environmental Group) approach to addressing the watershed contamination concern should the community support?
3. Groups will gather evidence to support their claim and justify their claims using the provided resource material. Information should be charted on poster paper or a whiteboard.
4. Groups will then participate in a carousel like mini debate session. One member of the group will remain at the group's board to defend the group's argument (and also receive feedback for counter claims or argument clarity). Other group members will rotate to critique the ideas of other groups.
5. Conclude the activity highlighting the importance of the watershed and related concerns.

**Assessment:**

Performance based: quality of arguments constructed within the mini debates.



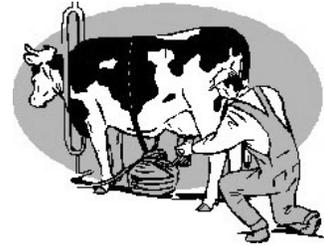
## WHOSE RIVER IS IT?

### Dilemma- The Magnolia River

#### 1. Positions

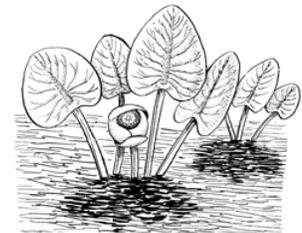
Pro-Dairy Farmers

Pro-River Citizen's Environmental Group



#### Scenario

2. River County is known as the "Milk Capital" of Florida. Fifty dairy farms are located on or near the Magnolia River. These farms provide 25 percent of Florida's milk and 80 to 90 percent of the milk consumed in southwest Florida. Each farm supports 1,000 cows, and each cow produces 85 pounds of manure a day - an amount equal to the fecal waste of 17 humans. Every time it rains large amounts of nutrient-rich waste washes into the Magnolia River. The Magnolia River feeds into Clear Lake, a popular recreational site for swimming, canoeing and fishing. The lake has been closed to swimming and fishing several times because of very high coliform bacteria counts.
3. Government agencies have known of this contamination to the river for twenty years, but it wasn't until recently that the River County Environmental Protection Commission instituted specific policies regarding the handling of animal wastes. River County's dairy farmers have been ordered to prevent animal excrements from entering the river. The necessary improvements are so expensive and the accompanying required reductions in herd sizes are so drastic, that at least six farmers say they are going to move their farms to another county.
4. River County's economy depends upon its dairy farms. They generate \$250 million in revenues for the county annually. Additionally they employ over 1,500 people. Without its dairy farms, River County would have to ship in milk from north Florida or other states, and consumers all over southwest Florida would end up having to pay a higher price for milk.
5. Clear Lake, on the other hand, also generates a large proportion of the county's revenues as a tourist attraction. Business owners in the area say they can't afford any more closures of the lake. Local residents insist that the contamination and related health hazards are unacceptable. Environmentalists claim contamination to the Magnolia River and Clear Lake is destroying valuable habitats.



Source: Waterways- Southwest Florida Water Management District