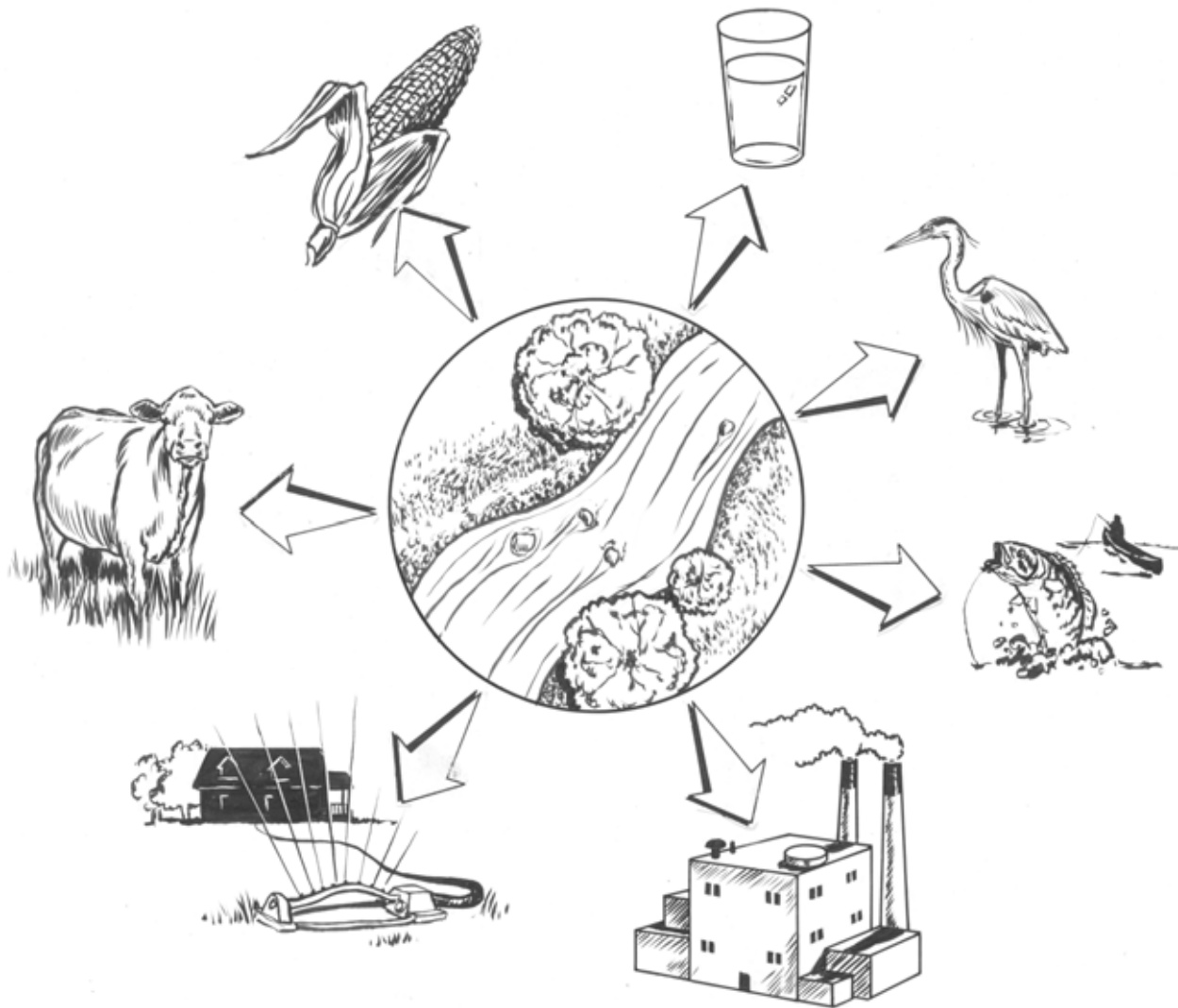


Streams and Society Module

Multiple uses of water resources leads to diverse and sometimes conflicting demands in a watershed. Cooperation between all water users is imperative to assure ample water quality and sufficient water quantity.



Introduction

The Environmental Protection Agency (EPA) in the federal government sets minimum standards for water quality protection. In Missouri, the Missouri Department of Natural Resources (MDNR) is the designated authority to write water quality standards that meet or exceed federal guidelines for protection. The state cannot write standards that are less than the federal standards. To carry out these responsibilities, the MDNR receives much of its funding from the EPA. In addition, MDNR issues permits to point source polluters, such as sewage treatment plants, concentrated animal feedlot operations, and other large businesses which discharge pollutants into Missouri waterways. The MDNR enforces state and federal pollution laws; but, it does not enforce local planning and zoning laws. Watersheds and their basins do not follow the political boundaries of counties, states, and national borders that have been outlined by society. Therefore, the EPA handles pollution problems that cross state lines. Within states, the EPA steps in and enforces state laws if the state agency is not adequately enforcing existing laws.

The MDNR and EPA have limited tax dollars and personnel. They spend a portion of their budget educating citizens to try to prevent pollution problems. Therefore, active participation in local, state, and national decision making processes is important for preventing and solving water pollution problems. Individuals, businesses, community, state, and county governments are all involved in water resource management and economics on a daily basis.

The cost of water influences individual and community decisions. It is as simple as deciding whether or not to take longer showers or as complicated as planning an upgrade for a wastewater plant. Prudent methods of decision making are important in resource management and include constructing a list of alternatives, identifying the pros and cons for each, and projecting possible outcomes. Factors to consider include cost (monetary and environmental), time, energy, persons likely to be affected, personal values, etc. Emotions and instincts also influence decisions. Citizens, as water users, need to realize that in conjunction with their rights they have responsibilities to other water users and inhabitants of their watershed. People can become involved in protecting water resources in a variety of ways. One of the most powerful methods is education. Helping others better understand the background and implications of an issue promote appreciation and concern. Examples of education activities include hosting water festivals, writing letters to editors of newspapers, sponsoring public debates, and making presentations to community groups or informational posters about water related issues.

Some problems can be corrected by people taking direct action through community service projects. For example, an education campaign to encourage citizens to implement water conservation practices helps conserve the community's water supply. Fundraising activities can help provide monetary support for a group or organization.

It is important for individuals, groups, or school classes contemplating a project to establish goals and objectives, select realistic projects, and thoroughly research the issue before deciding on what action to take. If projects are approached with a positive win/win strategy, then everyone will benefit.

Governor's Solution

Lesson Abstract

Summary:	Using a fictional news release, students will analyze the points of view of each of the characters mentioned in the story. This is done to help students broaden their perspective of the use of water in their community.
GLEI:	See Social studies and Communication Arts GLE on the Missouri Department of Elementary and Secondary Education (D.E.S.E.) Website: http://www.dese.state.mo.us
Subject Areas:	Communication Arts, Social Studies
Show-Me Standards:	Goals – 1.5, 1.6, 1.7, 1.10, 2.3, 3.1, 3.2 Strands – SC 1, 2, 3, 5, 8; CA 2; SS 3
Skills:	Analyzing, organizing information, concluding, defining problems, classifying, and categorizing
Duration:	1 class period (50 minutes)
Setting:	Classroom
Key Vocabulary:	Aesthetic, agricultural, cultural, ecological, economic, educational, egocentric, environmental, healthful, legal, political, recreational

Rationale:

- This lesson provides students with the opportunity to identify costs and benefits of multiple uses of water.
- This lesson helps students to continue development of their analytical skills.

Student relevance:

- Students are part of a community and can benefit from understanding how water is used and the needs for water in their community.

Learning Objectives:

Upon completion, students will be able to . . .

- Understand diverse points of view.
- Analyze information from a newspaper article.
- Recognize their own point of view.

Students Need to Know:

- Different uses of streams in their area.
- The water quality of the streams in their area.
- The different groups that use streams in various manners.
- How to pick out characters in a story.
- How to assign points of view to the characters.

Teachers Need to Know:

- The points of view that attach values to statements, ideas, and actions.

Resources:

Hungerford, H. R. and R. A. Litherland, R. B. Peyton, J. M. Ramsey, T. L. Volk.
Investigating and Evaluating Environmental Issues and Actions: Skill Development Program. Champaign, IL: Stipes, 1996.

Materials Needed for Lesson:

Points of View handout
Fictional News Release handout

Procedure:

- Introduce the points of view and their values using the *Points of View* handout.
- Have students read the *Fictional News Release* individually or out loud.
- Have students make a list of the characters.
- Divide into five groups and assign a character to each group.
- Using the *Points of View* handout, have each group assign points of view to each statement made by the character.
- Have each group share its analysis with the rest of the class.

Evaluation Strategies:

- Evaluate each group's analysis.
- Choose several of the characters and their statements and let students assign points to view. Use this as a quiz or test.

Extension Activities:

- Have students look up articles written about a stream in their community. Have them analyze these articles.
- Have students create a water file of articles collected from current newspapers and magazines referring to water use in Missouri.

Suggested Scoring Guide:

Governors Solution

Teacher Name: _____

Student Name: _____

CATEGORY	4	3	2	1
Identifies important information	Student lists all the main points of the article without having the article in front of him/her.	The student lists all the main points, but uses the article for reference.	The student lists all but one of the main points, using the article for reference. S/he does not highlight any unimportant points.	The student cannot identify important information with accuracy.
Identifies details	Student recalls several details for each main point without referring to the article.	Student recalls several details for each main point, but needs to refer to the article occasionally.	Student is able to locate most of the details when looking at the article.	Student cannot locate details with accuracy.
Identifies facts	Student accurately locates at least 5 facts in the article and gives a clear explanation of why these are facts, rather than opinions.	Student accurately locates 4 facts in the article and gives a reasonable explanation of why they are facts, rather than opinions.	Student accurately locates 4 facts in the article. Explanation is weak.	Student has difficulty locating facts in an article.
Identifies opinions	Student accurately locates at least 5 opinions in the article and gives a clear explanation of why these are opinions, rather than facts.	Student accurately locates at least 4 opinions in the article and gives a reasonable explanation of why these are opinions, rather than facts.	Student accurately locates at least 4 opinions in the article. Explanation is weak.	Student has difficulty locating opinions in an article.
Summarization	Student uses only 1-3 sentences to describe clearly what the article is about.	Student uses several sentences to accurately describe what the article is about.	Student summarizes most of the article accurately, but has some slight misunderstanding.	Student has great difficulty summarizing the article.

Rubric Made Using: **RubiStar** (<http://rubistar.4teachers.org>)

Points of view that Attach Values To Statements, Ideas, and Actions

1. **Aesthetic** – having to do with the beauty of something.
2. **Agricultural** – having to do with food and fiber production.
3. **Cultural** – having to do with customs of groups of peoples.
4. **Ecological** – having to do with the relationships between populations of organisms and their environments.
5. **Economic** – having to do with money or financial gain.
6. **Educational** – having to do with gaining knowledge.
7. **Egocentric** – having to do with an individual's wants and needs.
8. **Environmental** – having to do with human interaction with the ecosystem.
9. **Health** – having to do with freedom from diseases.
10. **Legal** – having to do with laws.
11. **Political** – having to do with the activities and policies of governments and their agents.
12. **Recreational** – having to do with leisure activities.

Adapted from a more comprehensive list found in *Investigating and Evaluating Environmental Issues and Actions: Skill Development Program*, page 34.

Fictional News Release **(For Classroom Use Only)**

STATE CAPITOL CITY, USA—Governor Alawayus B. Dorigth has called upon the state legislature to pass into law a bill which requires all property owners to be responsible for any form of precipitation that falls upon their lands. In a speech to the legislators, the governor cited the continued conflict between agricultural, industrial, recreational, and environmental interests over current and future uses of streams and rivers of the state.

The bill would require property owners to contain and control all precipitation that falls upon their property. This would allow every property owner use of his or her individual water supply. Each owner would be responsible for the recycling of water wastes and water purification on his or her respective property.

Plowin D. Farmer, executive director of the Farm Lobby Bureau, responded: “This won’t hurt the large farms, but those small farmers will have to drill many wells to supply water during the drought years. However, costs won’t be too bad. I believe production will continue at the same rate.”

Cecil A. Grababuck, chief executive officer of the Industrial Relations Board, stated he was shocked by this proposal. “Where do you suppose industry will get its water for production plants? We already are saddled with high taxes and environmental restrictions. This will add another deterrent to small business owners. They won’t be able to compete with the probable high costs of purchasing water. This will cause water to become a commodity like gasoline.”

Mary A. Splash, executive director of the Travel Commission, said she was appalled by the mere suggestion of such a law. “Water is a state-owned commodity. Every citizen has the right to access all of the water that falls upon the state. This law will completely ruin all of our recreational businesses. There will be no more lakes, rivers, or streams,” she observed. “What will people do for recreation?”

“This will ruin every ecosystem in the state and destroy all habitats,” added Purity O. Willow, director of the Environmental Wonder Society. “Without free-flowing water, there will be no interlocking of natural communities and our governmental entities will fail as well.”

Governor Dorigth countered that he understands all of the concerns, but this legislation, when it becomes law, will allow every citizens to use the water as he or she sees fit. “It will end the constant bickering over water,” he concluded.

Catch That Rainfall

Lesson Abstract

Summary:	This lesson is devised to follow the Governor's Solution. Students are given a "tract" of land and they must devise a system to catch and use all of the water that falls on their tract. They will have to manage a 2-centimeter rainfall for their 200 sq cm tract. They will also have to devise a method to store and use their rainfall. None of the rainfall can leave their property.
GLE:	7.1.A.6, 7.1.B.6, 7.1.C.6, 7.1.D.6, 7.1.E.6, See Mathematics and Communication Arts GLE on the Missouri Department of Elementary and Secondary Education (D.E.S.E.) Website: http://www.dese.state.mo.us
Subject Areas:	Science, Communication Arts, Mathematics
Show-Me Standards:	Goals – 1.3, 3.1, 3.3, 3.7, 3.8 Strands – SC 1, 2, 5, 7, 8; CA 6; MA 1
Skills:	Problem solving, predicting, estimating, reasoning
Duration:	1 class period (50 minutes)
Setting:	Classroom, laboratory, or outdoors
Key Vocabulary:	Drainage, storage, tract, property rights, water rights

Rationale:

- Water, which is a scarce resource, is essential for life.
- Society is faced with increasing and conflicting demands on water resources.
- Managing water for the future may require creative problem solving.
- Precipitation amounts are out of human control; however, people are dependent on water resources that are replenished by precipitation.

Student relevance:

- Students need practical experiences in dealing with their own property.
- Students can benefit from solving problems through conceptualization.

Learning Objectives:

Upon completion, students will learn . . .

- The difficulty in controlling water runoff.
- The complexity of problem solving.

Students Need to Know:

- Metric measurement in cm.
- Volume of water.
- How water moves.
- How much water gathers from 2 cm of rain.
- How to estimate the amount of rainfall landing on their property.

Teachers Need to Know:

- In what watershed their school building is located.

Resources:

- Local water company or county offices

Materials Needed for Lesson:

10 cm X 20 cm piece of cardboard

Plastic, clay, straws, jars, aluminum foil, pitchers, assorted containers

Metric measuring cups

Spray bottles

Trays to catch the overflow

Other available odds and ends that might be useful

Procedure:

- Review volume in metrics, 1 cubic cm = 1 mL of water.
- Divide class into groups of three or four and give each group a 10 cm X 20 cm cardboard which represents their property.
- Tell students they will need to construct a system to capture all the rainfall on their personal property using the available supplies. They must not allow water to run off of their property.
- Spray 400 mL of water onto the property to see if their system works.
- Share systems with fellow classmates.
- Ask students to write a short paragraph on what they learned from the activity and how to relate it to a real life situation.

Evaluation Strategies:

- Check the paragraph for understanding (what was the problem, how was it solved, who had the best solutions, and why).

Extension Activities:

- Have students collect newspaper and magazine articles about water rights disputes, floods, droughts, and pollution problems.

Suggested Scoring Guide:

Catch That Rainfall

Teacher Name: _____

Student Name: _____

CATEGORY	4	3	2	1
Appearance/Organization	Lab report is typed and uses headings and subheadings to visually organize the material.	Lab report is neatly handwritten or typed and uses headings and subheadings to visually organize the material.	Lab report is neatly handwritten or typed, but formatting does not help visually organize the material.	Lab report is handwritten and looks sloppy with cross-outs, multiple erasures and/or tears and creases.
Analysis	The relationship between the variables is discussed and trends/patterns logically analyzed. Predictions are made about what might happen if part of the lab were changed or how the experimental design could be changed.	The relationship between the variables is discussed and trends/patterns logically analyzed.	The relationship between the variables is discussed but no patterns, trends, or predictions are made based on the data.	The relationship between the variables is not discussed.
Replicability	Procedures appear to be replicable. Steps are outlined sequentially and are adequately detailed.	Procedures appear to be replicable. Steps are outlined and are adequately detailed.	All steps are outlined, but there is not enough detail to replicate procedures.	Several steps are not outlined AND there is not enough detail to replicate procedures.
Experimental Design	Experimental design is a well-constructed test of the stated hypothesis.	Experimental design is adequate to test the hypothesis, but leaves some unanswered questions.	Experimental design is relevant to the hypothesis, but is not a complete test.	Experimental design is not relevant to the hypothesis.
Conclusion	Conclusion includes whether the findings supported the hypothesis, possible sources of error, and what was learned from the experiment.	Conclusion includes whether the findings supported the hypothesis and what was learned from the experiment.	Conclusion includes what was learned from the experiment.	No conclusion was included in the report OR shows little effort and reflection.

Rubric Made Using: **RubiStar** (<http://rubistar.4teachers.org>)

Point of View

Lesson Abstract

Summary:	Students will use the book <i>A River Ran Wild</i> , by Lynne Cherry, to develop skills in reading and identifying characters and their point of view.
GLE:	See Social studies and Communication Arts GLE on the Missouri Department of Elementary and Secondary Education (D.E.S.E.) Website: http://www.dese.state.mo.us
Subject Areas:	Communication Arts and Social Studies
Show-Me Standards:	Goals – 1.5, 1.9, 2.3, 3.1, 3.2, 3.5, 3.6, 4.3, 4.7 Strands – CA 1, 7; SS 5, 6; SC 4, 5, 8
Skills:	Reasoning, evaluating, establishing criteria, analyzing
Duration:	1 class period (50 minutes)
Setting:	Classroom
Key Vocabulary:	Aesthetic, economic, ecological, environmental, egocentric, educational, cultural, agricultural, recreational, healthful, and political

Rationale:

- Critical reading and thinking are important skills in today's society.

Student Relevance:

- Students can benefit from analyzing historical events.
- Students can benefit from identifying different points of view from which people speak and act.

Learning Objectives:

Upon completion, students will be able to . . .

- Identify different points of view.
- Identify points of view in actions taken in the book *A River Ran Wild*.
- Identify the people having points of view in *A River Ran Wild*.

Students Need to Know:

- How to identify characters.
- How to read critically.
- How to analyze readings
- How history is responsible for many actions in the present.
- Historical perspective of watershed management.
- Cultural variables affecting attitudes toward natural resources.

Teachers Need to Know:

- Points of view and their definitions (see handout in Governor's Solution lesson).

Resources:

Cherry, Lynne. *A River Ran Wild*. San Diego: Harcourt, Brace & Co., 1992

Hungerford, H. R. and R. A. Litherland, R. B. Peyton, J. M. Ramsey, T. L. Volk.
Investigating and Evaluation Environmental Issues and Actions: Skill Development Program. Champaign, IL: Stipes, 1996.

Materials Needed for Lesson:

A River Ran Wild

Points of View handout – copy provided in Governor's Solution lesson

Characters and Their Actions handout

Pencils

Procedure:

- Review the *Points of View* handout with students
- Read *A River Ran Wild* aloud and let students pick out characters.
- Reread *A River Ran Wild* and let the students assign points of view to the characters.

Evaluation Strategies:

- Collect papers and check to see if correct points of view were assigned to the characters. Some could be controversial so use your judgment. This is not a finite science. Opinion plays a big part.

Extension Activities:

- Find articles from local papers and magazines. Use the same exercise to identify characters and points of view for these articles.
- Establish a collection of newspaper articles about water usage in your area or state and identify the points of view.
- Develop and conduct a survey to determine the points of view regarding a local stream.

- Construct a concept map and/or web site which makes a visual presentation of various points of view.

Characters and Their Actions and the Attached Point of View from A River Ran Wild

By Lynne Cherry

<u>People</u>	<u>Actions</u>	<u>Point of View</u>
Native People	drank clear water	health
	built dwellings	cultural
	planted corn	agricultural
	hunted	health
	traveled on river	economic
Native People	maintained rhythm with river, land and forest	ecological
Trader	traveled, traded	economic
Settlers	trapped	economic
Settlers	operated sawmills	economic
	cleared more forest	agricultural
Settlers	drove Indians from land	economic/cultural
Factories	produced chemicals/paper	economic/environmental
Citizens along river	pulp clogged river	aesthetic
	bad smells	health/aesthetic
	absence of birds, fish, and animals	ecological/health
Marion/Oweana	decided something must be done	environmental/political
Citizens	protested to politicians	political
Factories	stopped polluting	legal
Citizens	cleaned river/animals returned	environmental/aesthetic

Suggested Scoring Guide:

Reading - Analyzing Information : Point of View

Teacher Name: _____

Student Name: _____

CATEGORY	4	3	2	1
Identifies opinions	Student accurately locates at least 5 opinions in the article and gives a clear explanation of why these are opinions, rather than facts.	Student accurately locates at least 4 opinions in the article and gives a reasonable explanation of why these are opinions, rather than facts.	Student accurately locates at least 4 opinions in the article. Explanation is weak.	Student has difficulty locating opinions in an article.
Identifies details	Student recalls several details for each main point without referring to the article.	Student recalls several details for each main point, but needs to refer to the article occasionally.	Student is able to locate most of the details when looking at the article.	Student cannot locate details with accuracy.
Identifies facts	Student accurately locates at least 5 facts in the article and gives a clear explanation of why these are facts, rather than opinions.	Student accurately locates 4 facts in the article and gives a reasonable explanation of why they are facts, rather than opinions.	Student accurately locates 4 facts in the article. Explanation is weak.	Student has difficulty locating facts in an article.
Identifies important information	Student lists all the main points of the article without having the article in front of him/her.	The student lists all the main points, but uses the article for reference.	The student lists all but one of the main points, using the article for reference. S/he does not highlight any unimportant points.	The student cannot identify important information with accuracy.
Summarization	Student uses only 1-3 sentences to describe clearly what the article is about.	Student uses several sentences to accurately describe what the article is about.	Student summarizes most of the article accurately, but has some slight misunderstanding.	Student has great difficulty summarizing the article.

Rubric Made Using: **RubiStar** (<http://rubistar.4teachers.org>)