



 **The Rio Grande and ME**

 **El Río Grande y YO**

ABQ BIOPARK *A Teachers Guide to the BioVan*

GRADE LEVEL: K-1

What is the BioVan?

The BioVan is an education outreach program for the ABQ BioPark, which consists of the Aquarium, Botanic Garden, Zoo and Tingley Beach.

The mission of the BioVan is to give students an introduction to the diversity and interdependence of life and to encourage stewardship of the Rio Grande. The BioVan presentation follows the course of the Rio Grande as it starts in the San Juan Mountains of Colorado and empties into the Gulf of Mexico and open ocean of the Atlantic.

Why the BioVan?

The Rio Grande and ME. El Río Grande y YO. It's our responsibility to care for the river because it is important to us. It supports life here in Albuquerque all the way to the Gulf of Mexico. Community, plants and animals are nourished by its fresh water from its beginning in Colorado to the ocean. Water is a critical natural resource, and precious to us, especially in the southwest desert. The Rio Grande supports mountains, forest, river and desert ecosystems and all the plant and animal life associated with them in an interdependent web that extends further than we can imagine. In the end, what counts most is that we must be good stewards of the river, the Rio Grande. The ABQ BioPark and the BioVan help make this happen.

How do the BioVan work?

The BioVan is staffed by a facilitator, environmental educator, a teaching artist and volunteer Rio Rangers. It includes live animals, plants, biofacts and a follow-up activity. Using a variety of teaching strategies, the BioVan combines science with the arts. Other components of the program

include a teacher workshop, a Bio-Box which contains hands-on loan materials, grade-specific Teacher Guides and a free weekly hike in the Bosque for two classrooms!

How to Use the Teacher's Guides

Three BioVan Teachers Guides are available for grades K-1st, 2nd-3rd, 4th-5th. The same *key concepts* are noted in each Teacher's Guide. These concepts are to help guide the *teacher* throughout the BioVan learning experience. The grade level concepts do vary and are designed to build upon the previous grade concepts. The grade level concepts are for the *students*.

Each Teacher's Guide has three lessons: Water as a Natural Resource, The Rio as an Ecosystem and Stewardship. Each lesson has two activities: one activity is hands-on and one activity is written. Worksheets are at the back of each lesson. Each lesson is designed to interrelate with the other lessons within the guide and to build upon the same lesson in the other two grade-specific guides.

TEACHER CONCEPTS

Adaptation – a modification of an organism or its parts which enables it to survive and reproduce in its environment.

Aquifer – An underground layer of rock, gravel or sand that stores water.

Biodiversity – The variety of plant and animal species in an environment.

Conservation – The conscious use of natural resources in a way that assures their availability for future generations.

Ecosystem – A stable, naturally occurring system of interdependent living and non-living things.

Habitat – The dwelling place of a living thing, chosen for its availability of suitable shelter, space, food and water.

Interdependence – The relationships among living and non-living elements of the environment.

Natural Resource – A portion of the environment that can be drawn upon to care for a need.

Pollution – Any substance deposited in air, water or land leading to a condition of impurity, unhealthiness or hazard.

Riparian – Relating to the bank of a waterway such as a river.

Stewardship – The wisdom and respect we demonstrate to all living organisms and the habitats entrusted to our care.

STUDENT CONCEPTS

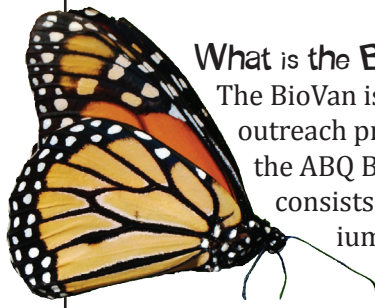
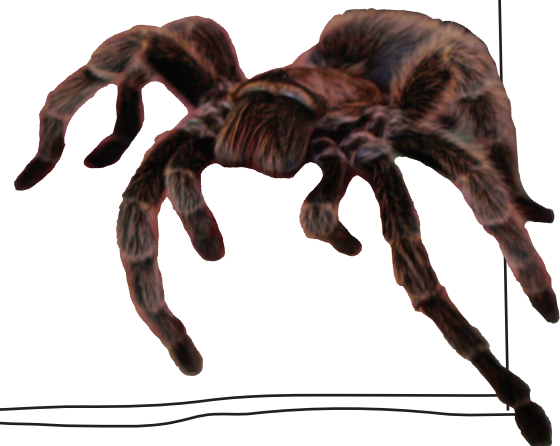
Animal – A living thing that gets food from the outside of its body.

Living – To be able to move, reproduce, grow and react.

Non-living – To be unable to move without help, reproduce, grow and react.

Observe – To learn by watching.

Plant – A living thing that uses the sun to make or help make food.



Theme: Water as a Natural Resource

Teacher Background

All living things must have water to survive. In their search for survival, many species, including humans, migrate to water. Early human inhabitants of the Rio Grande Valley, the Pueblos People, lived along the Rio, taking advantage of water found in oxbow marshes as well as riverside springs like La Joya near Belen. They built homes near the water and it played an important part in their ceremonies. Later, Spanish Colonial settlers took water from the river for irrigation. Their ambitious projects further enhanced the naturally fertile area along the river's edge. Today, Albuquerque residents of the Rio Grande Valley get all their fresh water from an underground aquifer. In an aquifer, rainwater seeps through the ground and is trapped by natural rock formations. As fresh water is needed, it is pumped out and into homes. These water sources are limited, so it is important that we learn to use the water wisely and protect it from pollutants.

Drip, Drip

Identify where the water we use in Albuquerque comes from.

Standards

Social Studies: Understand the basic needs and wants of people.

Science: Relate common inventions to their problems.

Introduction

With today's technology, we get water with a turn of the faucet. This simplicity makes it easy to forget the source. Begin a discussion about where we get our water.

- Why do you think Albuquerque is so close to the Rio Grande?
- Where can we find water nearby?
- Where does the water we use in our homes every day come from?
- What is an **aquifer**?



activity

Materials: 1 liter plastic soda bottle; sand; clear bowl; 1 cup of water.

Procedure: Fill the clear bowl with wet sand. Cut 4 1/2" from the top of the plastic soda bottle to make a funnel. Fill the base of the bottle with water. Place the funnel, point down, into the sand-filled bowl. Slowly pour water into the funnel.

Ask students to describe what they see.

Wrap Up: After several students have shared their observations, explain that this is how rainfall is stored in an **aquifer**. Ask:

- What happens to an aquifer when it doesn't rain?
- How might the water get from the aquifer to our homes?
- Why do we use water from the aquifer and not directly from the Rio Grande?



Dear Diary

Record ways people along the Rio Grande use the natural resources of water.

Standards

Language Arts: Share ideas and experiences.

Social Studies: Discuss the importance of water to life.

Math: Collect, organize and describe data.

Introduction

Water from the Rio Grande is used for irrigation, recreation and industry. Individuals use water in a variety of ways, too. Use the following questions to start a discussion about water usage.

- How many ways do you use water?
- How much water do you drink in a day?
- Do you think people would be living here without the Rio Grande?

worksheet

Materials: Dear Diary worksheet; pencils and crayons.

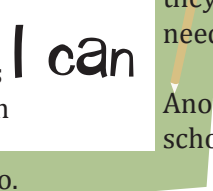
Procedure: Be sure students understand how the diary is set up and what each symbol means (wash hands, brush teeth, bath, drink water, water for pets, water plants, other). Have them make a tally mark in the appropriate space each time they use water in the ways listed. Because this activity is five days long, you will need to remind students each day to record their usage.

Another variation of the diary is to keep a record of how water is used in the school.

Wrap Up: After completing the diary, ask students to share their findings....

- Who was surprised at how much water they use? Why?
- What was the same in everyone's diary? What was different?
- What might a restaurant owner have in their diary? A fire fighter's diary?
- How can you **conserve** water on a daily basis?

To help students understand the effect of their individual actions, create a class bar graph depicting the total water usage. Label the type of use on one side and the amount of times used across the bottom. Draw a different colored bar for each category.



Theme: The Rio Grande as an Ecosystem

Teacher Background

All animals live where they have access to the resources that they need. From prehistoric times to the present, people, plants and animals have all coexisted along the Rio Grande. The fourth longest river in North America, the 1,885-mile-long Rio Grande presents an excellent example of a riparian zone, a ribbon of green that travels through the arid southwest landscape. This green corridor helps reduce floods, improve the water quality, lowers the surface temperature and channels the excess water to replenish the aquifer. The Rio is also an environment providing food, shelter and cover for such widely varying species as the raccoon, spadefoot toad, roadrunner and black-chinned hummingbird. Protecting the Rio Grande ecosystem provides us with the living examples of the relationships among living things and non-living things. As we study these relationships we learn more about the workings of nature and our place in the ecosystem, and why conservation is so important.

Color It Wild!

Recognize the ways in which living and non-living things interact with each other in the Rio Grande ecosystem.

Standards

Science: Investigate and show ways people depend on plants and animals.

Social Studies: Discuss the importance of water to life.

Art: Create an original piece of art and describe it.

Introduction

Introduce the concept that the river is one kind of **ecosystem** – a place where living and non-living parts interact with each other. For example, the river provides water for the plants to grow, which in turn can provide food or shelter for animals. Begin a discussion about interdependence using the questions below.

- How do animals/plants use the river? The area close to it?
- How do people use the river and non-living things?
- What parts of the river can animals/plants use?

Is it Alive?

Distinguishing between living and nonliving things.

Standards

Science: Observe and describe similarities/differences among **plants** and **animals**. Observe and classify objects by more than one attribute.

Language Arts: Write to express ideas using pictures and symbols.

Introduction

Lead a discussion with the students about the differences between living and non-living things:

- How are people and animals similar?
- How are people and plants similar?
- How are plants and people different?
- How are rocks and people different or similar?
- Can you name some living things? Non-living things?



Materials: Color It Wild! Worksheet; pencils; crayons.

Procedure: Have students complete the worksheet. Use the picture on the worksheet to help them understand that a river is home to many kinds of plants and animals. Allow them time to discuss the many ways people might use the river, too.

Wrap Up: Find out how much students understand about the Rio Grande.

- What might happen to the plants/animals if there were no water in the riverbed? Too much?
- What might happen to animals if there were no plants?
- What might happen to plants if there were no animals?

Make a river mural. Let the students draw, color in and label the living and non-living things found in a river's ecosystem.



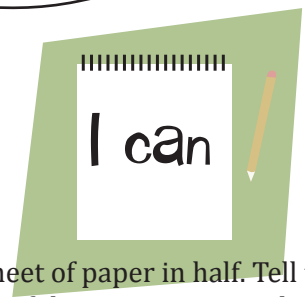
Materials: Paper; pencils; crayons.

Procedure: Have the students fold a sheet of paper in half. Tell them to draw a happy face (**living**) at the top of the paper in one column and a rock (**non-living**) in the other. Have the students bring these charts on a nature walk. Find a spot outside where the students can stop and observe the environment. For each living or non-living thing they find, have them draw a symbol of what they find in the appropriate column. Remind them that they are guests visiting a habitat and they should not pick up or remove a living or non-living thing from the place where it was found.

Wrap Up: When you return to the classroom, discuss their findings.

- Were there any living things that looked non-living?
- Did you see any living things using non-living things?

Remind the students that as people we differ from other living things because we can purposefully change the things we find in our environment to fit our needs. But, we must realize that the changes we make can affect the future of other living and non-living things.



Theme: Stewardship



Teacher Background

Rivers are among the most important geographical features of the planet. Everywhere rivers are found, there are many different kinds of living organisms using them, especially humans. Humans living along the Rio Grande have changed it in many ways, by building dams and ditches along its course; by emptying chemicals and waste materials into it; by introducing non-native/invasive species of plants and animals; by allowing cattle to trample its banks. Wetlands and young bosques of the Rio Grande have nearly disappeared. Testing the quality of the Rio's water regularly is one way to figure out what we need to do to keep the river healthy. Many people who work for the government and civic organizations, along with concerned citizens, care about the Rio Grande and work hard to maintain and reestablish the many kinds of plants and animals threatened by polluted water. The best cure for pollution, however, is learning how to avoid creating it.

Safe to Drink? Identify visible and invisible factors that may affect water quality.



Materials: A large empty jar; a small jar filled with river or ditch water; a small jar filled with water from the school water fountain; a small jar filled with muddy water (mix before class); coffee filter.

Standards

Science: Observe and describe states of water and avchanges between those states.

Health and Wellness: Identify safety hazards in the environment.

Introduction

Pollution is caused by the introduction of any substance (natural or synthetic) that leads to an unhealthy or hazardous condition. Some forms of water pollution are not easily seen. People use a variety of tests to determine the quality of water. Ask students what they think pollution is.

- Where have you seen pollution?
- What kinds of things can pollute the Rio?
- Why do you think people should work hard to keep the Rio clean?

Procedure: Label the three jars of water. Show the jars to the students. Ask: Which water might you drink? Why? If the only water to wash your clothes in was this (show them the muddy sample), what would you do? Demonstrate how people get clean water into their homes by using a filter. Place the filter over the large jar and slowly pour the muddy water through it. Would this water be safe to drink?

Wrap Up: Help children realize that preventative measures are the best way to keep water clean.

- Does the water filter keep all the pollution away?
- What are the other ways we can keep water clean?
- What is the best way to protect living things from pollution?

River Rangers

Observe ways we can protect the Rio Grande.

Standards

Science: Identify choices people have in the care of the environment and the consequences of those choices.

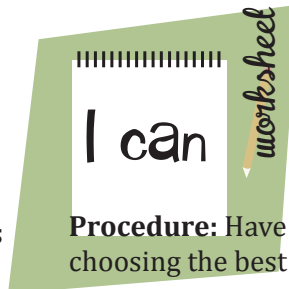
Social Studies: Begin to identify ways to protect water, air and land.

Introduction

With an increasing human population along the areas of the Rio Grande, the opportunity for problems on the river also increases. By observing the river ecosystem people will be better able to protect it.

- Have you ever seen the Rio Grande?
- What did it look like?
- Did you see things that didn't belong there, either in the river or along its banks?
- What can we do to help the Rio Grande?

Remind the students that even though the sample looks clean, some things can't be seen with your eyes. Water quality experts use special materials to discover whether water really is safe to drink.



Materials: River Rangers worksheet; pencils or crayons.

Procedure: Have the student complete the worksheet by choosing the best activities for the river.

Wrap Up: Have students discuss their choices.

- Why is it important not to waste water?
- How does recycling help the river?
- What can students do to protect the river?


Be a River Ranger and remind people to take care of the river and keep it clean.

By recycling, conserving water and controlling pollution we can keep the river healthy for all living things.


EXPLORER'S NAME _____

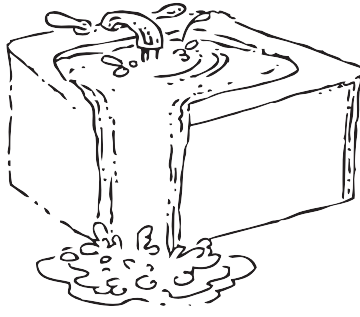
RIVER RANGERS

Be a River Ranger by choosing the activity that does **NOT** harm the river. Then make your own example.

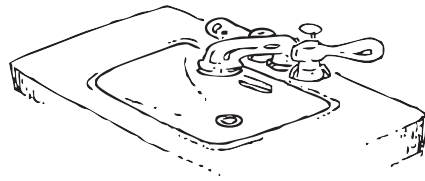


OR






OR




make your own

OR



OR



sample

EXPLORER'S NAME _____



Dear Diary

How I used water today!

wash hands brush teeth bath or shower drink water water for pets water plants anything else?

	wash hands	brush teeth	bath or shower	drink water	water for pets	water plants	anything else?
Day 1							
Day 2							
Day 3							
Day 4							
Day 5							