



Albuquerque Bernalillo County  
Water Utility Authority

## RIO (River Is Ours) Field Trip Classroom Unit

### Changing River (5E Plan – Day 1, 2)



Grade Level: 4 <sup>th</sup>	Subject: Reading, Science, Social Studies, Math
Lesson Title: <i>Changing River</i>	Lesson Length: 3 - 4 + hours

### The Teaching Process

#### Lesson Overview:

Students learn about the importance of the cottonwood trees in the bosque ecosystem, and what it means to be a keystone species. They learn about changes we have made to the river and the opportunity costs to the cottonwoods.

(This lesson ties into the seed activities in the Fourth-grade *Survival Kit* from the Center for Hands-on Learning.)

#### Lesson Objectives:

- Students will learn what a keystone species is and why the cottonwood is a keystone species in the bosque ecosystem
- Students will make a time line showing how we have changed the river in order to help us use it.
- Students will learn about invasive plants.
- Students will discuss opportunity costs.
- Students will model with mathematics and make a timeline of the bosque ecosystem changes

#### Standards addressed

##### Common Core

CCSS RI 4.1 Refer to details and examples to explain what the text says and infers (2F, 4F, 5S, 6S, 7S, 8F)  
 CCSS RI 4.3 Explain events from the text including what happened and why (Units 2F, 7F)  
 CCSS RI 4.4 Determine meaning of domain-specific words or phrases (2F, 4S, 5F, 7F)  
 CCSS RI 4.5 Describe chronology, cause/effect, problem/solution (5F, 8S)  
 CCSS RI 4.7 Interpret info on time line and explain how it contributes to understanding of the text (4F, 5S, 7F, 8F 10F)  
 CCSS RI 4.9 Explain how author uses reasons and evidence to support points (5F, 6F)  
 CCSS RI 4.10 Read and comprehend 4<sup>th</sup> grade informational texts (all units, R)

CCSSM Model with mathematics.

##### Nex Gen

4-ESS2.A Earth's Materials and Systems (Rainfall and the land and life – Cottonwood seeds)  
 4-ESS2.E Biogeology (Living things affect environment)

##### NM Science

II.II.4.3. Describe how roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight (photosynthesis).  
 III.II.I. 1. Understand how organisms interact with their physical environments to meet their needs (i.e., food, water, air) and how the water cycle is essential to most living systems.

##### NM Social Studies

Econ IV-A.4.1 Understand when choices are made that those choices impose "opportunity costs."

#### List of Materials

- Text of "Changing River"
- Timeline worksheet
- Cottonwood quiz for evaluation of understanding
- Masking tape or ribbon or butcher paper (or even chalk on the sidewalk, make a line about 18 feet long for the time line (one meter for each 100 years)
- Colored pencils or colored paper (optional)

## Instructional Sequence

### Phase One: Engage the Learner Day 1

Give students one minute to write down three things they would put in their backpack if they were going to live in a place no one has ever been before. Remind them that this is not a list of what makes them happy. It is what they NEED to survive. Use Think/Share/Pair to make sure everyone has an opportunity to participate.

The teacher maintains quiet in the classroom so that students can think. She makes sure that students are writing down their answers to share.

Students think of what they will pack. And write three things they will want to take.

### Phase Two: Explore the Concept

Ask each group to choose one of their items and try to convince the class that it is important enough to bring along. Share experiences they have had when this item came in handy.

Look at the items each group chose. Ask students to find categories that help them organize their responses. If they need help, you might mention possible categories Food, Water, and Shelter.

The teacher is writing down student responses on sticky notes and moving the notes around the board depending on how students decide to organize the information

Students think about what some of the responses have in common so that they make sure they have everything they will need. They organize their responses into categories.

### Phase Three: Explain the concept and define terms

The teacher explains that plants and animals are like people. They must live in places where they can get what they need to survive. An ecosystem is made up of all the things living (like plants and animals) and the things that are not alive (air, soil, water).

Albuquerque was built around a river ecosystem that provides everything the plants and animals in it need. It is the Rio Grande river ecosystem. This river runs through our city and the land surrounding the river is protected by the Rio Grande State Park.

Tell students that you are going to read the story, "Changing Faces, Changing Places." You may want them to read individually or in a group. Help students find meanings of topic-specific words from the context or in the dictionary. As they read, ask them to fill out the time line information on their worksheet. What did we change and why.

The teacher introduces the concept of "ecosystem." The teacher helps students figure out the meanings of new words that are subject specific. The teacher directs students to fill out the notes page about changes we have made to the river ecosystem.

Students are listening to directions.

Students read the story, "Changing Faces, Changing Places" individually or in a group.

As they read, students fill in the time line worksheet.

### Phase Four: Elaborate the Concept

Students will create a timeline of changes we have made to the river.

- Divide students into nine groups. Assign each group an event from the story.
  1. 1400 - Mosaic river (cottonwood, wetlands, grasses) caused by meanders in river and floods. They grew corn, beans, and squash relying mostly on rains. They used crops that didn't need much water.
  2. 1706 - Spanish settlers arrive in NM with Onate in 1598. Spanish settlers dig ditches (acequias) to irrigate crops. Some of these crops were carried from Spain on the Camino Real.
  3. 1880's Anglo Americans start to arrive on the Santa Fe Trail. Ranchers' sheep and cattle are eating a lot of the grasses and there is nothing to hold the dirt back when the rains come. The river is choked with mud. Fields are flooded and do not drain.

4. 1925 levees are built and drains dug (no more meander)
5. 1930 Salt Cedar and Russian Olive spread through the valley, invasives
6. 1941 The levee breaks and the last flood germinates cottonwoods, near the Nature Center that we see today.
7. Jetty Jacks in 1957
8. 1975 Cochiti Dam completed to control the flow of water in the river.
9. 1990 - present – agencies unite to break down banks of the river and flood small areas.

- Ask each group to make a picture of the change and be able to explain why that change was made.

**Continue on Day 1 if time allows or start here on Day 2**

- Using masking tape, or chalk or butcher paper or ribbon, indicate a line 6 meters (about 18 feet) long. Mark this timeline in 100 year (one meter) increments starting with 1400 A.D. and ending with 2000 A.D.
- Optional – Familiarize students with the timeline concept by marking some interesting events like Columbus arrives in America (1492), the Declaration of Independence is signed (1776), first cars are manufactured in the USA (around 1900).
- Ask one group at a time to place their picture of the river-changing event on the time line and explain what happened and why.

Teacher makes the time line on the floor of the classroom and indicates where each century starts. Students could do this with the teacher if you choose.

Teacher divides class into nine groups and assigns an event from the list above. Teacher makes sure groups know how to describe the event and consequences to the class.

Teacher calls each group forward, one at a time. Teacher asks them to describe their picture and what it means. Why did it happen?

Students draw their event and decide how to present their event to the rest of the class. What happened? Why?

Students come forward, one group at a time and lay down their river-changing event. They explain what happened and explain why it happened.

Whole class discusses how this event might have changed the ecosystem.

**Phase Five: Evaluate Students' Understanding of Concept**

The whole class takes the Cottonwood Quiz from the Bosque Education Guide.

One way to do this would be to have the teacher reads statement 1. Students declare their answers by raising their hands for "true" or "false." Teacher tallies answers. Ask students to find the information in the text that answers the question. Reread that passage. Graph the number of correct answers on the board. Which questions were easiest for students? Which questions gave them the most trouble? What might help them remember the answer?

Teacher reads the question. Tallies the answers. Asks students to find the place in the text where that answer is given.

Students decide if the statement is true or false based on their memory of text and activity. After answers are tallied, they reread the text to justify their answer.



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