18. Bosque Chaos

Description: By the roll of dice, students use the "Changing River" model to see how chance influences natural and human-caused changes in the bosque.

Objective: Students learn to recognize the natural processes for change and change due to human activities.

Materials: the "Changing River" model, first set up as Rio Bravo

dice

changing river component cards for Rio Bravo, Rio Manso and Rio Nuevo

Background: Before major human alterations, each spring when the snows melted, the river would rise, carrying a huge amount of water to the Gulf of Mexico. Some years there would be tremendous flooding; in other years, perhaps, mild overbank high-water levels. In a large flood, the river would often change its course, moving its channel to another location in the flood plain. In the summer the water level would drop until the summer storms brought more rain to the area. With this cycling of high water to low water, some plants would survive and some would not. Features along the river would also change. During a flood, sand bars could be washed away or deposited. The river channel could change course leaving oxbow lakes or dry channels.

Human alterations have decreased flooding and encouraged a long, narrow forest without diversity of age groups, so fewer cottonwoods survive each year and wetlands have become rare.

Now managers are working to improve the health of the ecosystem to maintain or reinstate as many aspects of Rio Bravo as possible. However, the role of chance is still important in what happens to a particular element of the bosque.

18. Bosque Chaos

Grades: 5–12

Time: one hour

Subject: science

Terms: channel, erosion, meander, nutrients, overbank flooding, oxbow, perennial, sand bar, saplings, sediment, seedlings

Procedure:

Section A: Rio Bravo

1. Set up the river model as Rio Bravo (see "Changing River" in this chapter).
2. Pass out dice to students—one per student or, if there are not enough dice, give one to each group of students, or designate one dice-roller for each round of the game.
3. Pass out the "Changing River" component cards for Rio Bravo and have students find an area on the model that fits the description on their cards. Features described on change cards are: sand bar with seedlings, sand bar without seedlings, stand of cottonwood saplings, mature cottonwood tree, meander in the river, river section, oxbow, marsh, grassy meadow, native shrub, and upland shrubs. Students may need to alter the model to fit their cards. Depending on the size of the model, you may want to have the students take turns.
4. Ask students to predict what will happen to the element on the model they have chosen if there is a large flood. Have the students read the cards. Explain that it is easier to predict these changes on a larger scale, such as "if there is a flood, some sand bars will be washed away," but much harder to say, "if there is a flood, this sand bar will be washed away."
5. Tell the students it is late spring in the river valley. It was a tremendous winter for snow, and now the melted runoff is coming down from the mountains. The students will roll the dice to determine how the feature they selected on the river is changed by the flood. They should now manipulate the model to reflect the change indicated on the card for the number they rolled.

   Note: Students will have to work cooperatively to change other components on the river to accommodate each change.
6. Have students explain how the river is different from before the flood. How is it the same? Have students exchange component cards, select a new feature on the model, and repeat another year's flood. Repeat this exercise as time and interest allow. What patterns can the students see? How much control do they have over their selected feature? Does that feature exist somewhere else on the model after the flood?

Section B: Rio Manso

7. With the river set up as Rio Manso (which may be on a different day), repeat this activity using the Rio Manso component cards. Explain that runoff from the Rio Grande watershed is now held by dams in lakes. Therefore, many of today's changes along the bosque are due to the absence of annual flooding. Ask students to explain some of the kinds of changes that are different and changes that are similar between Rio Bravo and Rio Manso.

Section C: Rio Nuevo

8. Now do the Rio Nuevo cards. In this version land managers are working to improve the health of the bosque ecosystem. Ask students to explain some of the changes that are different and other changes that are similar to the Rio Bravo and Rio Manso changes.

Extension: Combine this activity with "Who Lives Where?" in this chapter. Locate the animals on the model. After each round, explain how each animal fared through the flood or other change. Ask the students if the animal had to move. Was the animal able to find new habitat?