

# Borreguita And The Coyote

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Program Description: LeVar experiences Mexican American culture when he spends time with a family who has made guitars for three generations, visits a mural painter and her students who are working on self portraits, and joins Los Lobos as they share their music and cultural ties.

## Looks Good

**Key Words:** guitars, wood, observable characteristics, making comparisons, drawing conclusions

**Concept:** Wood is more bendable if it is wet.

In addition to knowing about the physics of sound, the Delgado family must be very knowledgeable about the properties of wood. They use special woodworking techniques of veneer, inlay, and wood bending to make guitars. The technique of wood bending is very important to any guitar maker since the curved sides of a guitar are made by bending thin pieces of wood. A guitar with straight sides just wouldn't sound the same. Try bending wood.

**Materials:** Craft sticks, dishes of warm water, sturdy tables or countertops, paper and pencil.

1. Have small groups of students place 6 craft sticks in a dish of warm water to soak for about 5 minutes.
2. Have a student from each group place a dry stick and a wet stick side-by-side on a table or countertop with the sticks hanging about 3 inches over the edge of the table. Holding the sticks in place with the palm of one hand, ask them to slowly push down on the overhanging stick ends with the palm of the other hand until one of the sticks cracks. (The sticks usually splinter and crack rather than break in two.) Have students try this six times, each time recording whether the wet or dry stick breaks first.
3. Have each group report their results and, based on their data, ask them to draw a conclusion as to whether dry or wet craft sticks are more bendable. (Wet ones are more bendable. Woodworkers usually steam wood before trying to bend it because steaming wood softens the bonds between the wood cells allowing the wood to be bent more easily.) Based on what they've observed, ask students why a freshly cut twig is usually more bendable than one that was cut several weeks ago. (The fresh twig will contain more water than the twig that was cut several weeks ago.) Ask students why it is important that wood in living trees be bendable. (If the wood did not bend it would be broken by the force of the wind and the weight of ice.)

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# Sounds Good

**Key Words:** guitars, sound, vibrations

**Concept:** The body of a guitar increases the sound made by the strings.

The Delgado family, three generations of guitar makers visited in this episode, know that making a guitar is an art form and a science. Their guitars not only look beautiful but also produce beautiful music. To create a guitar that makes a beautiful sound, they must apply physical properties of sound when making it. Experiment with a stringed instrument to learn how to improve its sound quality.



**Materials:** Small coffee cans, medium-sized rubber bands, aluminum foil.

1. Have pairs of students place a sheet of aluminum foil over the top of an empty coffee can. Place the foil so that it makes a shallow bowl shape in the top of the can. Then have them use a table knife to cut a 2" round hole in the center of the foil.
2. Have one of the students stretch a rubber band between their index fingers and ask the other to strum across the rubber band. Have them describe the sound the rubber band makes. (The sound will be very quiet.) Remind them that sounds are caused by vibrations. Ask them what is vibrating to cause this sound. (The rubber band.)
3. Have students repeat the strumming; however, this time holding the stretched rubber band across the top of the coffee can. Ask them to describe how the sound has changed. (The sound will be much louder.) Have them repeat strumming the rubber band in each way, observing the difference in sound. Why do they think the sound is louder when it is strummed across the can? (The sound of the vibrating rubber band is louder on the coffee can because the rubber band is now causing the air inside the can to vibrate as well.)
4. Have them make a simple instrument similar to a guitar by stretching several rubber bands around the coffee can from top to bottom. After they've had some time to strum their instruments, discuss the guitar segment from this episode. Ask them to describe how their instrument is similar to the guitar. (Both have strings, a base or body that supports the strings, and an air-filled part that amplifies the sound.) Ask them to describe how a real guitar would sound if it did not have a base or body, just strings. (It would sound much quieter, like the rubber bands before they were placed on the coffee can.)