

Wood Types/Porosity

Subject(s): Science

Grade Level: K-3rd

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Elementary

Time Required: 45 minutes

Lesson Objectives:

To understand that hardwood contains pores and that some of these pores allow for airflow while others do not.

Materials Needed:

Six 4 inch samples each of red oak and white oak, small container with 50/50 mixture of water and dish soap, pencils, and student journals.

Procedure:

1. Review the differences between hardwoods and softwoods.
2. Observe samples of red oak and white oak and compare them.
3. The teacher will dip one end of a red oak sample into the soapy solution and blow hard producing a foamy stream of bubbles. The teacher will do the same thing with the white oak sample to illustrate that no bubbles appear from the end of it.
4. The students will discuss possible reasons for the different outcomes when dipping the red and white oak samples in the soap. The teacher then points out the visible pores in the red oak and explains the existence of the **tyloses** (see explanation below) in the pores of the white oak.
5. The teacher blows into an unobstructed straw to demonstrate airflow and then does the same using a straw with a small piece of clay obstructing the pathway to help illustrate the effect that the tyloses have on the pores of the white oak.

Explanation:

All hardwoods contain pores (large hollow cells stacked together to form long hollow tubes oriented in the longitudinal direction). Some hardwoods such as the oaks contain very large pores. These pores are so large that they are easily visible to the naked eye, and air can be blown through a sample of red oak. In some hardwoods, such as white oak, the pores contain *tyloses* that block airflow. **Tyloses** are bubble-like tissue from adjacent wood cells that invade and occlude the pores. Because of the presence of tyloses, it is not possible to blow air through a long sample of white oak.

Discussion:

1. Why did the bubbles come out of the red oak, but not the white oak?
2. What do you think would happen if we put water instead of air into the open straw and then into the straw with the clay in it?
3. What do you think might happen to water in red oak compared to white oak?
4. Would a jug be better made out of red oak or white oak?