

# The Singing Tree



**Plant roots have hair! Root hairs increase the surface area of roots to improve absorption of water and minerals.**

## The Approach

Billy utilizes comprehensive sensory integration through song, dance, audience participation and a multi-dimensional backdrop to lure performance attendees into the life cycle of a tree. The importance of trees and the ways in which all of humanity benefits from them, both standing and harvested, are revealed.

Photosynthesis, plant physiology, predator and prey relationships, insect life cycles, and water quality are a few of the scientific concepts that are presented in an accurate manner. Students will be engaged by the original songs and enjoy learning as they participate in vocal parts, gestures, and dance.

## The Objective

Students in grades K-2 develop an awareness of their connection to trees as they are introduced to photosynthesis, plant physiology, pollination, and seed germination.

Students in grades 3-6 discover how fascinating and necessary trees are to their own survival as they learn about chlorophyll, chloroplasts, transpiration, glucose, water molecule cohesion and much more.



## The Result

Billy B was fantastic. He was the envy of all our teachers in terms of his ability to engage our kids, invite as many as 60 at a time to participate on the stage, and to keep the whole thing orderly and fun.

*Director of Lower School*

## Suggested Pre-Performance Activities

### PRE-PERFORMANCE ACTIVITIES K-2

Have children draw a picture of a tree and ask them to include in their drawing one item that they use in their daily lives that is made from a tree or contains tree. Examples: wood furniture, fruit, or maple syrup.

Review vocabulary words provided in this guide.

### PRE-PERFORMANCE ACTIVITIES 3-6

Have the students collect the leaves of five different trees in their neighborhood and identify them by name. Have the students list ways in which their lives are affected by trees or the lack of trees in their neighborhood.

Review vocabulary words provided in this guide.

## The Singing Tree In the Classroom

### Vocabulary Words

#### Grades K-2

**bark** - the rough outer covering of the woody stems of trees or bushes.

**bud** - a flower that has not yet opened or an outgrowth on a stem or branch consisting of a shortened stem and immature leaves or flowers, often enclosed by protective scales.

**minerals** - an inorganic substance that must be ingested by animals or plants in order to remain healthy. Minerals occur naturally in rocks and in the ground and have their own characteristic appearance and chemical composition.

**root** - the part of a plant that has no leaves or buds and usually spreads underground, anchoring the plant and absorbing water and nutrients from the soil.

**root hairs** - a fine growth from the outer cells of a plant root that resembles a hair and absorbs nutrients. Root hairs are elongated epidermal cells that increase the surface area of roots to improve absorption of water and minerals.

**sap** - a watery liquid containing mineral salts, sugars, and other nutrients that circulates through the conducting tissues of a plant.

**sapling** - a young tree with a slender trunk.

**soil** - the top layer of most of the Earth's land surface, consisting of the unconsolidated products of rock erosion and organic decay, along with bacteria and fungi.

**sprout** - to begin to grow from a seed, to develop buds or shoots.

**stem** - the main stalk of a plant, bearing a leaf, bud, or flower.



#### Grades 3-6

**absorb** - to soak up a liquid or take in nutrients or chemicals gradually.

**carbon dioxide** - a heavy colorless odorless atmospheric gas. Used during photosynthesis in nature, as well as man-made products such as refrigeration, carbonated drinks, and fire extinguishers.

**chlorophyll** - the pigment in plants that captures the light energy required for photosynthesis.

**chloroplast** - a membranous sac that contains chlorophyll and other pigments and is the place where photosynthesis occurs within the cells of plants and algae.

**fungus** - a single-celled or multicellular organism without chlorophyll that reproduces by spores and lives by absorbing nutrients from organic matter. Fungi include mildews, molds, mushrooms, rusts, and yeasts.

**minerals** - an inorganic substance that must be ingested by animals or plants in order to remain healthy. Minerals occur naturally in rocks and in the ground and have their own characteristic appearance and chemical composition.

**nectar** - the sweet liquid that flowering plants produce as a way of attracting the insects and small birds that assist in pollination.

**ovary** - the lower part of a pistil that bears ovules and ripens into a fruit.

**oxygen** - a colorless odorless gas that is the most abundant element, is essential for plant and animal respiration, and is a product of photosynthesis.

**photosynthesis** - a process by which green plants and other organisms turn carbon dioxide and water into carbohydrates and oxygen, using light energy trapped by chlorophyll.

**pistil** - the female reproductive part of a flower and including the ovary, style, and stigma.

**pollen** - a powdery substance produced by flowering plants that contains male reproductive cells. It is carried by wind and insects to other plants, which it fertilizes.

**root hairs** - a fine growth from the outer cells of a plant root that resembles a hair and absorbs nutrients. Root hairs are elongated epidermal cells that increase the surface area of roots to improve absorption of water and minerals.

**sap** - a watery liquid containing mineral salts, sugars, and other nutrients that circulates through the conducting tissues of a plant.

**sapling** - a young tree with a slender trunk.

**stomata** - tiny pores in the outer layer epidermis of a plant leaf or stem that control the passing of water vapor and other gases into and out of the plant.

**transpiration** - to lose water vapor from a plant's surface, especially through stomata.

**vapor** - a gaseous substance.

**water cycle** - the constant circulation of water between atmosphere, land, and sea by evaporation, precipitation, and percolation.

## Post Performance Activities

1. Review with the students which elements trees and all plants need to grow (water, minerals, air, sun and soil.) Talk about these elements and how their quantity and quality affects plants.
2. Discuss with students the fact that trees are the earth's largest plants.

3. As a class, generate a list of the ways in which we use trees daily through product consumption and as a food source.
4. Discuss the role of trees in energy conservation, i.e., shade, windbreak, erosion, and noise absorption.
5. Discuss trees as a habitat for animals with students in grades K-3.
6. Discuss the outcome of intensive tree harvest with no reforestation plan with students in grades 3-6.
7. (K-2) Have students write words or sentences about trees in their neighborhoods. (3-6) Give the students an imaginary bag of tree seeds. The seeds will become whatever type of tree they want. Have them write a paragraph or two about where they would plant the seeds and why.
8. THE FRUIT CHAIN! Try a teacher guided, improvisational play. Have some children become fruit trees, growing flowers and fruit. Other children pick the fruit, drive it to the grocery store, purchase it, take it home and wash and eat it.
9. Outdoors, under a tree, listen for and try to identify animal sounds in the tree. Listen for other noises such as carpenters working on a building, chain saws, or the wind. Listen to the audio tape, "Billy B. Sings about Trees."

## Teacher Resources

1. Billy B's CD entitled "Billy B Sings about Trees" is enchanting, educational and just plain fun. This musical tribute to the world's largest plants explains how trees grow, how they provide food and shelter for forest animals, and why they are important to every creature on Earth. The CD contains nineteen original songs and can be previewed and/or purchased at <http://billybproductions.com/>. Click on Store, Purchase CD's, then *Billy B Sings about Trees*.
2. Billy B's video entitled "Outside with Billy B" is a high energy video featuring thirty minutes of wild, zany fun for children ages 4-8. Children learn how to move like a bee or "sprout" like a flower. Purchase this video at <http://billybproductions.com/>. Click on Store, Purchase Videos, then *Outside with Billy B*.
3. Contact Project Learning Tree and ask for the Supplement Activity Guide, K-6  
The American Forestry Foundation, 1111 19th Street, NW, Suite 780, Washington, DC 20036  
or visit their web site at [www.plt.org](http://www.plt.org)
4. Sharing Nature with Children by Joseph Bharat Cornell
5. The Tree Book, Creative Curriculum, 4302 Rolla Lane, Madison, WI 53711

## Reading Materials

### Grades K-2 with teacher assistance

- Discovering Plants by Glenn Blough  
A First Look at Leaves by Millicent Selsam  
The First Book of Trees by Maribelle Cormack

### Grades 3-6

- The True Book of Trees by Illa Podenorf

This is a Leaf by Ross Hutchins

First Book of Conservation by Frances C. Smith-Watts

Life in a Log by George Schwartz

Wonders of the Tree World by Cosgrove

## National Science Education Standards

**Nature in the City** conveys connections to the following standards:

### ***Science as Inquiry***

\_The dispositions to use the skills, abilities, and attitudes associated with science

### ***Physical Sciences***

\_Properties of objects and materials

\_Transfer of energy

### ***Life Sciences***

\_ Characteristics of organisms

\_ Life cycles of organisms

\_ Organisms and environments

\_ Structure and function in living systems

\_ Reproduction and heredity

\_ Populations and ecosystems

\_ Diversity and adaptations of organisms

### ***Earth and Space Sciences***

\_ Properties of earth materials

### ***Personal and Social Perspectives***

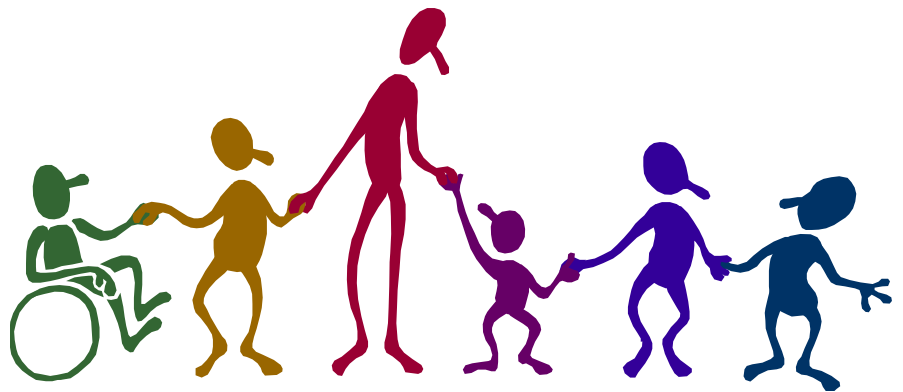
\_ Types of resources

\_ Changes in environments

\_ Populations, resources, and environments

\_ Personal health

\_ Natural hazards



***Science and Technology***

\_Abilities to distinguish between natural objects and objects made by humans

\_Science and technology in local challenges

National Research Council. *National Science Education*

*Standards*. Washington, D.C.: National Academy Press, 1996.