

Native Texas Forest Boardwalk



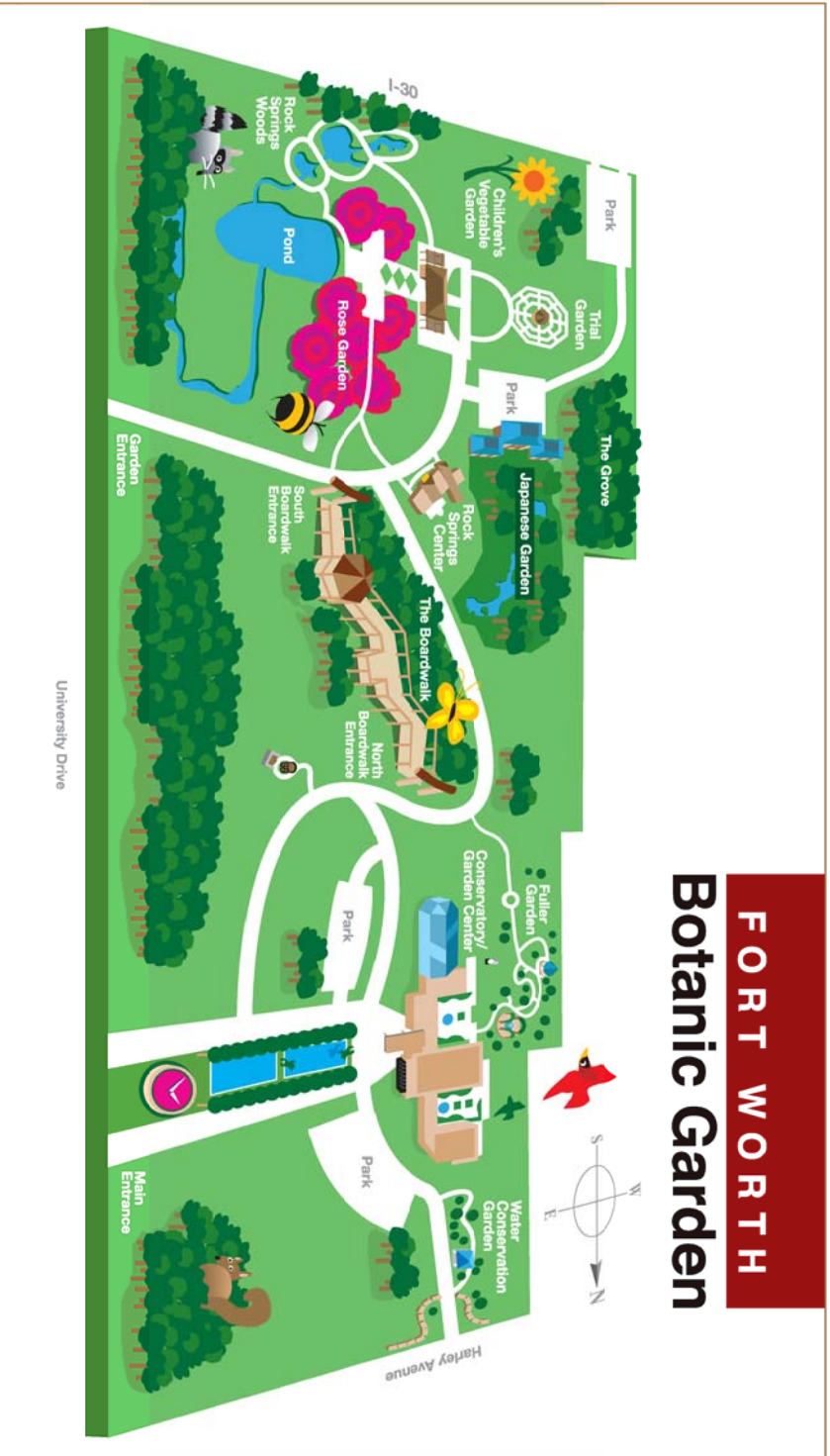
HIGH SCHOOL STUDENT VERSION

Education Department 2008-2009

Featuring thirteen interpretation stations, beginning at the south end and walking north.

The Botanic Garden has many specialty garden and natural areas. Choose one and circle it on the map. Consider it as a habitat. Describe the biotic and abiotic factors there. Look for an animal or plant. What is its role in that ecosystem?

FORT WORTH Botanic Garden



Station 1--Forest Diversity

The leafless trees of winter- oaks, maples, elms, and beeches- typify the _____ **Forests**. The fallen leaves mulch next year's flowers.

Coniferous Forests can withstand cold. Fir, spruce, and pine exhibit the needle-shaped leaves on slender trees shaped for shedding snow. Trees with leaves (needles) remaining are _____.

The Pacific Northwest exemplifies **Temperate Rainforests**. The amount of rainfall is _____, the weather is mild, but temperatures below freezing occur regularly. Douglas fir and coastal redwood thrive with ferns, mosses, lichens, and fungi on the damp, dark ground.

Tropical Rainforests grow around the equator. The evenly warm and wet climate supports a complex system of amazing plants and animals.

People plant trees for _____ or food crops. The **Plantation Forests**, though useful, lack species diversity and don't replace natural forests.

Urban Forests are remnant natural forests combined with planted trees in urban and suburban areas. These forests counteract the "heat island" effect of roads, buildings, and parking lots of our cities. Home owners often plant non-native, ornamental trees in their landscapes, but using native or adapted trees is best.



The metroplex contains a diverse group of different forest types, each evolving in response to changes in climate, soil, fire, and animals. In the last 150 years, weather, farming, logging, introduced species, and urban development have reshaped our forests. Each of these factors influences the types of plants that will grow in a given area.

Station 2—Dendrochronology

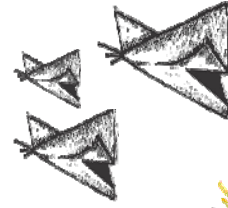


A tree's yearly growth is marked internally by a ring. Its age is determined by _____ of rings. The shape and color of a ring is affected by events such as fires or drought. In cross dating, rings from different tree samples are aligned by year. The environmental "record in the wood" is verified.

EARLY INHABITANTS



The Rock Springs area was ideal for Indian tribes. The area provided food, and raw materials for clothing, tools, and shelter. Important were the buffalo and shelter along the Trinity River. How does the community today use the area?



Trinity River

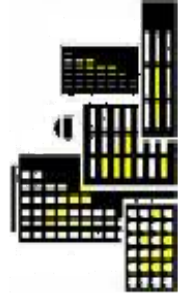


EARLY SETTLEMENT

Cheap land with plenty of timber and game along with an abundance of water made our area a promising place for families of settlers to start a new life. What natural resource is important today?



FORT WORTH TODAY



When the railway came, it transformed Fort Worth. What role does transportation play in the city today?.

A **nut** may be defined as a one-seeded fruit with a hard pericarp (wall). Nuts are eaten by people and animals. Can you find these two nuts in the Texas Native Forest Boardwalk area?

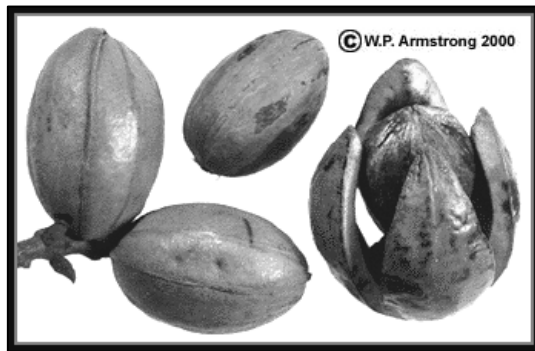
Count the total of acorns and pecans.

Acorns = _____ Pecans = _____

What is the total of nuts found? _____

What **percent** of nuts are acorns? _____ Pecans? _____

Scatter the nuts on the ground. What might happen to them ?



Pecan: Look for the husk, which splits into 4 sections (valves). The nut is surrounded by a thick, woody outer wall (**pericarp**).



Acorn: The true nut sits in a cup-shaped structure (**involucre**) composed of numerous overlapping scales. Acorns are produced by _____ trees.

Station 3—Arboreal Mechanics

Dendrology, or forest botany, teaches how trees are named (nomenclature), physically described (morphology), grouped with other trees (classification), recognized in the wild (identification), and where found (distribution).



The **crown** is also called the treetop. The **canopy** contains the uppermost branches. Its size depends on the growth of the tree— the crown gets taller as it ages. Certain types of trees have crowns of a particular shape.

Leaves manufacture food, store food, absorb CO₂, respire _____, absorb liquids, exude liquids, filter air, and continuously orient themselves to capture sunlight. Shade leaves tend to be larger and thinner than leaves in the sun. When deciduous leaves fall, a distinctive **leaf scar** is created on the twig, helping to identify the species in winter.

Flowers on trees can range from showy to almost invisible.

Trees produce an array of **Fruits**, including the fleshy kind as well as nuts. _____ are formed by evergreens.

Twigs are small branches that support leaves, flowers or fruit. At the tip is the growing section, where new cells are formed with amazing speed. Generally, trees with large leaves have fewer branched twigs whereas trees with small leaves have finely-branched twigs. Twigs contain a high percentage of vascular tissue, so they are a favorite food of beavers and other wood-eating animals.

Structural branches give each tree canopy its distinctive shape and form the major intersections along the “vascular superhighway” that runs from the roots to the leaves.

The _____ or bole is the main support for the tree, often holding several tons of wood and leaves. It must be strong and flexible to survive winds and heavy rains. Under the bark is the vascular system; the **phloem** transports food down from the leaves, and the **xylem** transports water upward from the roots.

Roots are specialized structures (usually underground which support the tree and gather water and soil nutrients. Roots can store food. Most of a tree’s roots are less than _____ feet deep.

Station 4—Decomposition/Carbon Sink

A **carbon sink** retains large amounts of _____ for very long periods of time. A carbon sink keeps carbon out of the natural carbon cycles of combustion and metabolism (“short” cycles). Forests store carbon inside tree trunks and on the forest floor. The largest carbon sinks are the fossil fuels under the surface of the earth.

By burning fossil fuels, we remove carbon from the “long” cycle and placing it in the “short” cycle. Humans are negatively affecting carbon recycling of the short cycle by cutting down forests.

Station 5—Photosynthesis

Photosynthesis is the process plants use to make _____. Light energy combines with water and carbon dioxide to create sugar, plus the byproducts of oxygen and water. The green parts of plants are the food factories. Water comes up from the roots and carbon dioxide comes in from tiny openings on the underside of leaves.



Station 6—Dinosaur Forests

Conifers dominated the dinosaur’s forests. The plants which became coal lived and died hundreds of million of years before *Triceratops* browsed!

Station 7—Ecosystems

An ecosystem is a system of living organisms (microorganisms, plants, and animals) all interacting among themselves and with the environment they live in (soil, climate, water and light). Ecosystems can be tiny or vast. This boardwalk is an ecosystem. A teaspoon of leaf litter is another. Name an ecosystem: _____

Station 8—Biomes

The **Biosphere** is where all life occurs- the air, land, surface rocks, and water. A region’s physical environment, along with its plant and animal life, is a **Biome**. Terrestrial and _____ are the basic biomes. Climate is part of the environment. A **climate** is not the same as weather, but is the average pattern of weather for a biome. Our climate is humid subtropical with hot summers. The average temperatures of all biomes are increasing. This is **global warming**.

Station 9—Interdependence

Every organism is dependent on others for survival. Plants and animals are connected in a _____. An owl catches a mouse that ate a beetle that fed on a caterpillar that chewed a leaf. A raccoon eats a crow that feeds on dead fish. Some food chains can be long!

Station 10—Succession

Succession is natural progression of changes occurring over time within an ecosystem. The plants on the east side of the boardwalk represent a mature forest similar to the original one. On the west are the invasive species which grow when the native interdependencies are broken after trees are cut down. Invasive plants may “escape” from a local yard.

Station 11—Sustainability

Sustainability is meeting our needs without harming the ability of future generations to meet their needs. Trees are _____ resources. Lumber companies have been growing, harvesting, and replanting trees in farms for decades. A tree farm should manage the soil and, beneath the trees, the watershed. We should care for our trees in parks, along streets, and around homes to maintain our cycles of nature.

Station 12—Conservation

The health of our forest community is maintained by encouraging species diversity and allowing organisms to complete their life cycles. On the east is the “natural” forest; on the west is “unprotected growth.” What differences do you see? _____

Station 13— The World Beneath Your Feet

There is more energy in the leaf litter than in the trees! This layer is full of long and varied **food webs** among them, arthropods, fungi and bacteria. The feeding of these unseen creatures frees organic matter locked in dead material, and concentrates proteins and minerals needed by larger animals. Decomposition breaks down organic nitrogen into ammonium and nitrate, the forms used by plants.

