



TWELVE HILLS
NATURE CENTER

talkSTEM
Share. Engage. Inspire.™

walk**STEM**®

- at -



TWELVE HILLS

NATURE CENTER

Created by the North Texas Master Naturalist Class of 2019
in partnership with the Twelve Hills Nature Center and the talkSTEM nonprofit organization
Sponsored by the talkSTEM nonprofit organization

Every child is a STEM child • Every space is a STEM space



Welcome to the Twelve Hills Nature Center

This walking tour consists of 10 stops. You may visit any number of stops that you like and you may visit the stops in any order you like. Each stop stands alone. Each stop has a key question as its focus. Some stops may require materials. ***Two sets of tools are located in a plastic box inside the Nature Center, in the southeast corner along the gray fence.** If your group requires more than two sets of tools, please contact us a few days in advance of your visit at twelvehillsnaturecenter@gmail.com. Bring a notebook or print and bring the notes section included below.

walkSTEM stops at Twelve Hills Nature Center:



1. Welcome to Twelve Hills Nature Center - pg. 10

What ecosystem are you in right now, and what is unique about it?

STEM Concepts: comparison

Materials Needed: none



2. What lives in these boxes? - pg. 12

Which bird do you think uses the box you see here? What is the box for? Why do we pick certain shapes and sizes for bird boxes?

STEM Concepts: comparison, estimation, design, engineering

Materials Needed: ruler or tape measure*



3. How far did I walk? - pg. 15

What is a quick and easy way to find out how far we walked?

STEM Concepts: measurement, calculation

Materials Needed: 10 feet of paracord, or rope, or string, calculator*



4. How strong is flowing water? - pg. 16

Why did they use concrete to surround the banks of the creek? And where does all the water go when it rains?

STEM Concepts: engineering, science

Materials Needed: paper and pencil



5. Can you hear the Cottonwood tree leaves rustle in the breeze? - pg. 18

How loud can a tree be?

STEM Concepts: engineering, geometry, design

Materials Needed: paper and pencil



6. Can a tree feel like a cave? - pg. 20

Why does this tree remind us of a cave? Why are trees important, especially for life in the city?

STEM Concepts: geometry, science

Materials Needed: air thermometer, angle-o-tron*



7. Yucca's Perfect Pom-Poms - pg. 21

How is the yucca's geometry unique?

STEM Concepts: geometry

Materials Needed: paper and pencil



8. What is a snag? - pg. 23

What fraction of this particular tree is alive and what fraction is a snag?

STEM Concepts: measurement

Materials Needed: use the graphic provided



9. The bedstraw is sticking to me! - pg. 25

How is this plant well-designed to go home with you?

STEM Concepts: biomimicry, botany

Materials Needed: none Season: Spring



10. Picnic Table Contemplations - pg. 27

How does this area compare to the other spaces in the Nature Center?

STEM Concepts: comparison

Materials Needed: none



All the walking tour content is designed for you to make connections between what you see here and STEM questions and concepts. STEM is short for Science, Technology, Engineering, and Math and we have partnered with the talkSTEM nonprofit organization to produce this experience. Our goal is for every child and adult who goes on this walkSTEM@Twelve Hills Nature Center tour to see our space through the lens of STEM and to appreciate the fact that the questions are infinite. We hope you are inspired to ask and answer your own questions while you are here and that you enjoy this tour. You can enjoy the stops in any order you like.

How To Be Present in a Nature Preserve

Welcome to Twelve Hills Nature Center! As you walk the trail, can you use all your senses to take in the rich experience offered by nature? Listen to birds singing and insects buzzing, smell the sweet or pungent odors emitted by plants, look at the vast variety of shapes, sizes and colors of flowers, plants, butterflies and other wildlife.

Volunteers have made this experience available to you by recreating the Blackland Prairie plant communities that were present on the site for eons until farms and buildings occupied it. Think of visiting Twelve Hills like you think of visiting a natural history museum or an arboretum. Conduct yourself accordingly, and consider with respect the flora and fauna, their origins, their support for pollinators, and the educational potential the Nature Center offers.

Please protect Twelve Hills and yourself by following these rules:

- Be careful as you walk on the rocky trails.
- Please stay on the trails and do not walk through the meadows.
- Do not pull, destroy or remove anything from the Nature Center.
- Please use care and caution as you view plants and pollinators.
- Do not write on the rock in the gathering area.
- Dogs must be leashed, kept on the trails, and picked up after.
- Please be courteous to other visitors.
- Smoking, alcohol and drug use are prohibited.

We want all our visitors to enjoy the beauty of the nature center with as little evidence of human disruption as possible – thank you!

This material is based upon work supported by the National Science Foundation under Grant DRL 2115393. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation



Map of the Twelve Hills Nature Center





About talkSTEM

talkSTEM is a nonprofit organization that wants to inspire today's youth to grow their unique STEM (science, technology, engineering and math) mindsets, to pursue STEM education, and to join the exceptionally large and varied STEM workforce. It has a focus on girls and other groups under-represented in STEM professions. talkSTEM's vast selection of resources emphasize equitable and inclusive experiences.

The walkSTEM initiative is an informal way to look at STEM connections of all sorts in all kinds of places, from playgrounds to palaces. The walkSTEM @ Twelve Hills Nature Center experience guides visitors of all ages to appreciate nature through the lens of STEM. There are many walkSTEM tours throughout Dallas.

You are invited to share your selfies, and your personalized STEM questions at #walkSTEM as you take this and other STEM walks. They'll inspire others exploring the world through the lens of STEM!

 talkSTEM  @talkingSTEM  @talkingSTEM  talkSTEM  @talkSTEM

talkSTEM and SMU are studying methods to inspire STEM engagement in youth through a recently awarded National Science Foundation grant: Mathfinders-Seeing the World through a Mathematical Lens. Find details at sites.google.com/view/mathfinder. Twelve Hills Nature Center is a partner site for Mathfinders.

About Twelve Hills Nature Center

Established in 2005 on reclaimed land in the heart of North Oak Cliff, Twelve Hills Nature Center is a long narrow five-acre natural area being restored toward native Blackland Prairie by volunteers. The prairie provides habitat for wildlife, educational opportunities for local schools and a place of refuge for neighbors and nature lovers. A walk on the hilly .5 mile loop trail takes visitors through meadows with native grasses, wildflowers, butterflies and birds, and through forested edge areas.

The mission, "cultivating conservation ethics through our Blackland Prairie restoration and nature education" comes alive through our workdays and educational offerings. Local schools visit Twelve Hills on their own and for organized programs.

Volunteers restore Blackland Prairie habitat and maintain the entrance and butterfly gardens. They lead nature walks and nature events, develop educational materials, and record plant and animal presence with iNaturalist and eBird. They conduct hands-on education and conservation activities for students from local schools.

Twelve Hills is an all-volunteer 501(c)3 nonprofit. There is a deed restriction on the land so it will not be developed. It is a North Texas Master Naturalists' volunteer project. Find more information at:

twelvehills.org

 TwelveHills

 [twelvehillsnaturecenter](https://www.instagram.com/twelvehillsnaturecenter)



A Note to Families and Teachers:

A walkSTEM® tour is a walking tour of any place where you look at the place through the lens of science, technology, engineering, and math. It's for all ages and all backgrounds – anyone with curiosity about what's around them. No – you don't need to be a brainiac to go on a walkSTEM tour, and you don't need any special academic training! And, yes, we also definitely include arts and design connections!!

What is walkSTEM®?

A walkSTEM® tour is deliberately designed to include questions that strengthen critical thinking skills by encouraging learners to explore their real-world environment and think “outside the textbook.” We believe every person is a STEM person and every space is a STEM space, and the ultimate goal of walkSTEM® is to foster the development of each individual's unique STEM identity. We hope that as you explore the nature center (or any space!) you will have fun and develop your inner STEM explorer.

How to use our walkSTEM® @Twelve Hills Guide

The walkSTEM® @Twelve Hills guide is meant to help learners of all ages slow down and discover how much one can learn about this gem in Oak Cliff as well as more about nature, conservation efforts, and everyday surroundings.

Parents: We hope you will enjoy exploring the Nature Center with your children.

Teachers and after school educators: The walkSTEM® methodology promotes collaboration between learners. Please consider using a variety of grouping strategies (e.g. whole group discussion, Socratic Method, partners, small groups, or by learning style) with your learners as they work through activities.

The goal of the suggested activities outlined in each guide is to promote critical thinking and inquiry amongst learners as they actively explore the robust activities designed by the Twelve Hills Nature Center team. As such, these guides are flexible – choose the activities you feel will best fit your child's learning styles or support concepts they are currently studying. You can choose one or multiple walkSTEM® stops to focus on during your visit.

Learn more at talkSTEM.org (click on the walkSTEM tab)
Questions? Email koshi@talkSTEM.org



Notes section for students

Write your questions and notes, draw your sketches, and have fun!

Entrance to Twelve Hills Nature Center

What ecosystem are you in right now, and what is unique about it?

Bird Boxes

Which bird do you think uses the box you see here? What is the box for? Why do we pick certain shapes and sizes for bird boxes?

How far did I walk?

What is a quick and easy way to find out how far we walked?



Creek

Why did they use concrete to surround the banks of the creek? And where does all the water go when it rains?

Cottonwood Trees

How loud can a tree be?

Cave Tree

How do we determine tree age? Why are trees important, especially for life in the city?

Yucca

How is the yucca's geometry unique?



Snag

What fraction of this particular tree is alive and what fraction is a snag?

Bedstraw

How is this plant well-designed to go home with you?

Picnic Table

How does this area compare to the other spaces in the Nature Center?