



# Texas Master Naturalist Program's Statewide Curriculum and Basic Training Guide

The purpose of this document is to share the updated Texas Master Naturalist curriculum's unit goals. These should be used as a guide for Texas Master Naturalist chapters as they develop their basic training schedule and instruction. Also included below are a few sample agendas with suggestions on ways to incorporate the curriculum units together or to utilize local resource locations for field experiences. Please take this document as suggestions for ways to organize your basic training schedule. The curriculum materials must be taught as outlined by the statewide Chapter Management and Operations Protocols (Article II. B. Curriculum Development), however the order and style of their use in your agenda is discretionary. All chapters are subject to a training agenda and curriculum review periodically to assure required curricula and training standard minimums are being met.

## **Intro to the Texas Master Naturalist™ program**

### **Unit Goals**

- \* Describe what a Master Naturalist™ is
- \* Identify and communicate the mission and goals of the Master Naturalist volunteer program
- \* Identify and communicate the requirements and responsibilities of a Texas Master Naturalist

## **Land Stewardship**

### **Unit Goals**

- \* Define land stewardship
- \* Discuss the role of private and public lands management in conservation
- \* Describe the five management tools outlined by the naturalist, Aldo Leopold
- \* Be encouraged to develop their own land ethics

## **Archeology**

### **Unit Goals**

- \* Understand archeological concepts and methods
- \* Become familiar with Texas cultural history
- \* Become familiar with the Texas archeological regions
- \* Become familiar with the antiquities law

## **Historical Naturalists of Texas**

### **Unit Goals**

- \* Understand the importance of expeditions and surveys in the natural history of Texas
- \* Discuss the history of naturalists in Texas and their accomplishments
- \* Identify the most significant naturalists of Texas and in your local chapter's area.

## **Ecological Regions of Texas**

### **Unit Goals**

- \* Identify and differentiate the features of Texas' ecological regions and subregions
- \* Understand and communicate the need for different maps denoting various ecological regions of Texas
- \* Explain some of the key factors underpinning the ecological diversity occurring in Texas

## **Ecological Concepts**

### **Unit Goals**

- \* Explain the ecological principles that apply to individual organisms, populations, communities, and ecosystems
- \* Explain the balances that exist between ecosystems and what factors are necessary to keep ecosystems in balance
- \* Explain how different ecosystems are determined largely by different environmental factors
- \* Describe the hydrologic cycle, the nitrogen cycle, and the carbon cycle
- \* Explain what is meant by succession and climax and list the factors responsible for each
- \* Illustrate a food web and explain the importance of trophic relationships
- \* Define biodiversity and understand the importance of managing for biodiversity
- \* Identify ecological factors that are relevant to a threatened species
- \* Understand the laws and procedures necessary for protecting species

## **Ecosystems: Concepts and Management**

### **Unit Goals**

- \* Understand and discuss the seven principles of ecology
- \* Describe management, ecosystems, and ecosystem management
- \* Identify the five ecological principles that can help assure the Earth's ecosystems

## **Geology and Soils of Texas**

### **Unit Goals**

- \* Become aware of and understand the basic geologic processes of rock formation and the interactions which were instrumental in forming the geology of Texas
- \* Trace the geologic history of Texas
- \* Describe the various landform regions of Texas
- \* Discuss the hydrologic cycle and describe all possible sources of water
- \* Describe the physical and chemical properties of soil

## **Weather and Climate**

### **Unit Goals**

- \* Discuss what processes affect the daytime and nighttime temperature
- \* Describe the main processes driving Texas weather and climate
- \* Identify cloud formations and the weather and climate they can predict or represent
- \* Understand the short-term and long-term relevance of climate variability and change to Texas ecology
- \* Describe a typical year of weather in Texas

## **Texas Water Resources**

### **Unit Goals**

- \* Understand the water cycle and identify water resources of Texas
- \* Be aware of the importance of water conservation and protection of both surface and groundwater sources
- \* Understand the management of water resources in Texas including water rights and ownership

- \* Be familiar with state water planning and groundwater management
- \* Understand water availability models, drought contingency plans, and water conservation plans
- \* Become familiar with the Texas Parks and Wildlife Department's Land and Water Strategic Plan
- \* Understand how water quality is assessed, managed, and the planning process is being used to improve water quality
- \* Be familiar with state and federal agencies and water resources institutes that work with the public in water quality
- \* Become familiar with emergent water policies and issues
- \* Understand the benefits that rainwater harvesting and other conservation practices can provide

## **The Nature of Naming**

### **Unit Goals**

- \* Demonstrate ability to classify and identify common local tree species in the field
- \* Discuss the uses and importance of the classification system
- \* Identify main parts of a scientific name
- \* Understand why the binomial classification system is important
- \* Discuss the pitfalls of using common names

## **Plants**

### **Unit Goals**

- \* Explain why it is important to be familiar with plant names and some cases where knowing plant names can help
- \* Describe the classes of plants
- \* Become familiar with and describe the parts of a plant
- \* Compare and contrast the four classes of plants
- \* Become familiar with leaf and flower, types, placement, and arrangements to identify plants
- \* Explain what an invasive plant is and give some examples

## **Ornithology**

### **Unit Goals**

- \* Understand the causes for bird diversity
- \* Understand and discuss the habit of bird migration
- \* Identify the primary flyways of North America and Texas
- \* Explain bird behavioral characteristics to environments and environmental changes
- \* Develop an awareness of how bird populations are monitored and managed
- \* Identify and communicate how birds function within ecosystems
- \* Become aware of and communicate conservation concerns for birds

## **Entomology**

### **Unit Goals**

- \* Demonstrate an appreciation for insects and an interest in entomology
- \* Discuss why insects are so biologically diverse, why this diversity is threatened, and why the conservation of insect biodiversity is important
- \* Demonstrate familiarity with the insect fauna of Texas
- \* Discuss basic principles of insect behavior and ecology and relate these to environmental adaptations

- \* Understand the systematic relationships among various insect groups
- \* Demonstrate knowledge about the general characteristics of the major groups of insects
- \* Understand the role that insects play in local ecosystems and various other ecosystems in Texas
- \* Discuss the habitat needs of various groups of insects
- \* Demonstrate knowledge of methods for collecting insects
- \* Recognize rare or special species that indicate habitat qualities

## **Ichthyology**

### **Unit Goals**

- \* Demonstrate an appreciation for fishes and an interest in ichthyology
- \* Discuss the diversity of fishes in Texas and demonstrate familiarity with the different groups of fishes
- \* Understand the relationship among various groups of fishes
- \* Demonstrate knowledge about the general characteristics of the major groups of fishes
- \* Discuss basic principles of fish behavior, physiology, and ecology and relate these principles to environmental adaptations
- \* Discuss the habitat needs of various groups of fishes

## **Herpetology**

### **Unit Goals**

- \* Be able to communicate the characteristics of amphibians and reptiles and how they differ from other vertebrates
- \* Understand the relationships among the major groups of amphibians and reptiles and how they are related to fish, mammals, and birds
- \* Have basic knowledge of ecology and life history of amphibians and reptiles in Texas
- \* Outline and communicate the challenges confronting conservation of amphibians and reptiles in Texas
- \* Outline and communicate the issues affecting the conservation of Texas herpetofauna

## **Mammalogy**

### **Unit Goals**

- \* Demonstrate an appreciation for mammals and an interest in mammalogy
- \* Understand and communicate the 11 major characteristics of mammals
- \* Be familiar with the three major taxonomic groups of mammals and what characteristics define those groups
- \* Discuss the diversity and distribution of mammals in Texas and demonstrate familiarity with the different groups of mammals
- \* Demonstrate knowledge of estimating/measuring mammal populations
- \* Demonstrate knowledge of methods for trapping, marking, monitoring, and observing mammal populations
- \* Understand the role that mammals play in the ecosystems of Texas
- \* Discuss the habitat needs of various groups of mammals

## **Forest Ecology and Management**

### **Unit Goals**

- \* Identify the major forested regions of Texas
- \* Understand the diversity of forests found in Texas
- \* Compare and contrast forest and urban forest ecology
- \* Understand and describe the stages of succession in natural and forested ecosystems
- \* Understand the benefits and ecosystem services forests provide
- \* Know the important role fire plays in ecological restoration of healthy forests
- \* Be familiar with traditional forestry management
- \* List and describe the benefits and ecosystem services trees provide in an urban environment

## **Aquatic Systems Ecology and Management**

### **Unit Goals**

- \* Describe the characteristics of water
- \* Communicate the characteristics and properties of aquatic systems
- \* Understand and communicate how aquatic systems function
- \* Be familiar with management techniques for aquatic systems
- \* Understand and communicate threats to aquatic systems

## **Wetland Ecology and Management**

### **Unit Goals**

- \* Explain what a wetland is
- \* Know the types of wetlands
- \* Be familiar with the wetlands of Texas
- \* Describe the types of wetlands in Texas
- \* Be familiar with the state and federal regulations affecting and governing wetlands conservation in Texas

## **Rangeland Ecology and Management**

### **Unit Goals**

- \* Define and describe rangeland
- \* Define Rangeland Management
- \* Describe why range management is different from agricultural vocations
- \* List the basic component categories of range management
- \* List and describe the four founding principles of grazing management
- \* Understand and be able to communicate the importance of land management goals
- \* Describe how native grasses grow
- \* Describe, compare, and contrast rangeland management tools
- \* Develop an awareness of grazing, brush and weed issues and management on Texas rangelands

## **Urban Systems**

### **Unit Goals**

- \* Clearly differentiate the meaning of urban ecosystems, urbanization, and urban sprawl
- \* Compare urban and natural ecosystems in terms of diversity, interrelationships, cycles, and energy
- \* Understand the unique ecology of urban ecosystems in terms impacts on abiotic characteristics, nutrient cycles, and the water cycle; green and gray spaces; plants and animals

- \* Determine the levels of plant and animal diversity in urban areas when compared to natural ecosystems

## **Laws, Regulations and Ethics**

### **Unit Goals**

- \* Explain the differences between Texas Laws and Texas Regulations
- \* Describe who owns Texas wildlife
- \* Become familiar with some early history of conservation law
- \* Define situations Texas Master Naturalists may face, and how to best answer them
- \* Broadly understand the federal and state permitting process
- \* Demonstrate the working relationship between conservation law enforcement, Master Naturalists, and the general public
- \* Identify why ethical standards are important for Texas Master Naturalists

## **Volunteers as Teachers**

### **Unit Goals**

- \* Discuss what interpretation is
- \* Discuss types of interpretation
- \* Identify and understand components of an interpretive experience
- \* Demonstrate audience management techniques
- \* Develop/outline an interpretive program or experience
- \* Understand the differences between a topic and a theme and the importance/functions each serves

## **Citizen Science**

### **Unit Goals**

- \* Define citizen science and its history
- \* Become familiar with different citizen science programs
- \* Learn how to develop a citizen science project for the local chapter
- \* Become familiar with the goals of that state's Nature Trackers Program
- \* Become familiar with the Texas Quail Index program

**★Systems Approach Sample Agenda**– This agenda is designed in a systems approach format where each of the dominant ecological systems of a chapter's area is studied together with the soils, flora and fauna of those systems emphasized during their study. This agenda includes 10 classes and four field trips.

## General Information

### **Class 1 – Introduction, Historical Naturalists & Ecological Concepts**

- Intro to MN program (discuss nuts and bolts of program, assign "mentors")
- Pre-test (real test without names on them to assess knowledge)
- What is a Naturalist? Historical naturalists of the region.
- General ecological concepts (ecosystems, niche, relationships, carrying capacity, trophic levels, energy flow, nutrient cycling, edge effect, diversity, etc.)
- Archeology of the region

### **Class 2 – Ecological Regions, Weather, Water & Geology**

- Overview of the Ecoregions of Texas
- Weather and Climate of Texas & Region
- Soils/Geology of Texas (basic introduction as further description is given for each system)
- Water Resources – of Texas and Region

## Aquatic Systems

### **Class 3 – Aquatic Systems Introduction**

- Soils/Geology associated with Aquatic Systems
- Aquatic ecosystems processes (oxbow formation, eutrophication, wetland water polishing, etc.)

**Field Trip** to teach Best Management Practices for Aquatic Systems (proper veg. management, proper watershed management, etc.)

### **Class 4 – Aquatic Systems Flora and Fauna**

- Flora (dominant species, general characteristics and adaptations for aquatic life)
- Fauna (dominant species, adaptations to living in the various aquatic habitats, intro to the various groups of critters, examples of major players and their niches)

## Prairie Systems

### **Class 5 – Prairie Systems Introduction**

- Soils/Geology associated with Prairie Systems
- Prairie ecosystems processes (gilgai formation, fire, grazing, etc.)

**Field Trip** to teach Best Management Practices for Prairie Systems (proper grazing / fire management, controlling exotics, etc.)

### **Class 6 – Prairie Systems Flora and Fauna**

- Flora (dominant species, general characteristics and adaptations or prairie life)
- Fauna (dominant species, adaptations to living in the prairie habitats, intro to the various groups of critters, examples of major players and their niches)

## Forested Systems

### Class 7 – Forested Systems Introduction

- Soils/Geology associated with Forested Systems
- Forested ecosystems processes (succession, fire, tree life cycle, etc.)

**Field Trip** to teach Best Management Practices for Forested Systems (proper veg. management, snag retention, etc.)

### Class 8 – Forested Systems Flora and Fauna

- Flora (dominant species, general characteristics and adaptations for forest life)
- Fauna (dominant species, adaptations to living in the various forested habitats, intro to the various groups of critters, examples of major players and their niches)

## Urban Systems

### Class 9 – Urban Systems Introduction and Flora and Fauna

- Soils/Geology associated with Urban Systems
- Urban ecosystems processes (landscape practices, etc.)
- Flora (disturbances in flora resulting from urbanization)
- Fauna (responses of wildlife to urbanization, increasers and decreaseers)
- Laws & Policies, working within the political system, new trends in growth

**Field Trip** to teach Best Management Practices for Urban Systems (proper landscaping, watershed management, restorations, etc.)

## Naturalist as Volunteers

### Class 10 – TMN Volunteers Ethics and Opportunities

- Land Stewardship (what to do with information given)
- Ethics (round table discussion on ethics and stewardship)
- Volunteers as Teachers, Following Laws & Regulations (interpretation and inspection of volunteer code of conduct/BMPs)
- Citizen Science Opportunities locally
- Post-test
- Chapter sponsored Volunteer opportunities



**★”Ologies” Approach Sample Agenda** – This agenda is designed to focus on each of the major “ologies” studied within context of the local ecosystems present in a chapter’s ecoregion. This agenda includes 12 classes and three field study trips.

**Class 1 – Orientation, Program Overview**

- Intro to TMN program
- What is a Naturalist? Historical naturalists of the region
- What are Ethics? Land stewardship and Ethics discussion
- What are the Laws? Laws & regulations of local resources

**Class 2 – Ecological Regions of Texas, Ecosystem Concepts and Mgmt**

- Overview of the Ecoregions of Texas
- General Ecosystem Concepts
- Overview of Local Ecosystems (Forest, Range & Aquatic)
- Field Study:** View of each ecoregion with in the chapter’s territory

**Class 3 – Resources of Texas**

- Soils/Geology of Texas & Region
- Weather and Climate of Texas & Region
- Water Resources – of Texas and Region

**Class 4 – Herpetology & Field Study**

- Overview of Herpetology
- Herps found in Local Ecosystem(s) (Herps of the Forest, Herps of the Range, Herps of Aquatic)
- Endangered/Threatened Herps of Area
- Field Study** – Collection and Frog Calls Demo

**Class 5 – Mammalogy**

- Overview of Mammalogy
- Mammals found in Local Ecosystem(s) (Mammals of the Forest, Range, Aquatic)
- Endangered/Threatened Mammals of Area

**Class 6 – Ichthyology**

- Overview of Ichthyology
- Fish found in Local Ecosystem(s) (Fish of the Forest, Range, Aquatic)
- Endangered/Threatened Fish of Area

**Class 7 – Entomology & Field Study**

- Overview of Entomology
- Insects found in Local Ecosystem(s) (Insects of the Forest, Range, Aquatic)
- Endangered/Threatened Insects of Area
- Field Study** – Collection and Insect Mounting Demo

**Class 8 – Botany**

- Overview of Botany
- Plants found in Local Ecosystem(s) (Plants of the Forest, Range, Aquatic)

-Endangered/Threatened Plants of Area

**Class 9 – Archaeology**

- Overview of Archaeology of Region
- History Review (Important Naturalists)

**Class 10 – Ornithology & Field Study**

- Overview of Ornithology
- Birds found in Local Ecosystem (Birds of the Forest, Range, Aquatic)
- Endangered/Threatened Birds of Area
- Field Study** – Watching and Interpretive Guide Demo

**Class 11 – Next Steps as a Volunteer**

- Interpretation and Effective Communication
- Chapter Projects Sign Up
- Citizen Science Projects for Chapter and Solo

**Class 12 – Graduation**

- Post Test, Review all Materials, Answer any Questions
- Graduation Ceremony