TREE TRAILS

PROJECT FIELD TEST
WITH
SELECTED CLASSROOM TEACHERS

Presented to
Texas A&M Forest Service
&
Texas Urban Forestry Council

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I. INTRODUCTION

The purpose of this report is to provide Texas A&M Forest Service (TFS) and Texas Urban Forestry Council (TUFC) with an evaluation of the Tree Trails Project Field Test. This report includes the rationale for the project, it goals, objectives and a summary of the success of the project. Further, the report attempts to use the data results to offer evidence for suggestions, recommendations, and other information contributing to the continued success of Tree Trails.

Background

Tree Trails is a mapping and curriculum project of TFS and TUFC to expand the educational interests of both organizations. Tree Trails was supported by a grant from the USDA Forest Service. It is the mission of TFS to provide statewide leadership to assure the state's trees, forests and natural resources are protected and sustained for the benefit of all. It is the purpose of TUFC to serve as a forum for education, networking and advocacy for those interested in impacting the community forests of Texas. Both organizations believe strongly that our students are critical and key to the success of the future of our forests. Both organizations believe that students' participation in forestry programs can make a significant difference to our society's ability to improve forests. Creating trails of trees and delivering learning modules in the schools provides kids, citizens and communities a way to learn about forests where they live. As a result of their mutual educational goals, TFS and TUFC worked collaboratively to create Tree Trails for schools to raise public appreciation, awareness, and support for tree care and forest management. Both organizations firmly believe that Tree Trails will create a new generation of citizens, who will become stewards of our rural and urban forests by learning to conserve, protect and enhance our trees, forests and the environment.

Goal

The goal of Tree Trails is to create learning forests in schools. Tree Trails intends to serve schools with an online program that is time efficient, cost effective, supported by scientific research, and aligned with Texas Education Association state standards. This Tree Trails Project Field Test was developed as a workable model with fifth-grade students that can be implemented throughout Texas, eventually resulting in a learning forest in every school. The Tree Trails Project Field Test provided an online opportunity for teachers and students to be involved in developing a statewide program with TFS and TUFC.

Objectives

1. Get kids outside to learn about forests and trees and their uses, values and benefits.
2. Provide 10 instructional modules that educate students on trees and forests and national and regional priority issues including tree function, measurement,

benefits, diversity, ecosystem, forest health, fire, tree history, urban forestry and forest service learning.

3. Provide modules that have a research-based instructional approach which integrate language arts, math, science and technology, and state testing measures with outdoor learning activities to create real and virtual arboretums at schools.
4. Combine classroom digital media and internet technology with outdoor learning opportunities and to enable classrooms to effectively engage in learning about trees and forests with each other.
5. Provide evaluation tools for assessing and creating a reliable, viable and sustainable Tree Trails curriculum for teachers and students.

Tree Trails Project Field Test Plan

TUFC and TFS value the need to field-test modules to gain vital input from teachers and students. It is necessary for establishing a strong, valid and reliable curriculum for all participants. The Tree Trails Project Field Test intent was to test 10 modules in fifth-grade classrooms that represent the state's diverse school population: ethnic diversity, economic disadvantage, and academic performance.

The 10 Tree Trails lesson modules, teacher resource materials and internet links were accessible online at www.tfsweb.tamu.edu/treetrails. These connect to an online GIS mapping system where the tree trails were mapped and data entered into the system and were accessible at www.texasforestinfo.com. Tree Trails training and materials were provided free to participants.

Selected schools were contacted and commitments from teachers and administrators to participate were confirmed. Training sites and dates were scheduled. Teachers determined a plan for implementation.

The teacher commitment required each class to complete 10 lesson modules, including the pretest and posttest evaluations and teacher surveys. Additional data collected and analyzed included interviews, classroom anecdotes and other formative and summative evaluation instruments.

Participating schools, teachers and students were awarded certificates of participation in the Tree Trails Project Field Test. A $500 stipend for participating teachers was awarded by TUFC upon completion of the 10 lesson modules, teacher and student evaluations, and submission of recommendations and suggestions.

Once the Tree Trails Project Field Test was complete, the coordinators reviewed and analyzed the data collected regarding the training, modules, ancillary and resource materials, online

application and all other components of the Project. Revisions, adjustments and modifications were completed. The revised Tree Trails lesson modules contain recognition of all field test participants' contributions. In particular, TUFC members and TFS staff were recognized for making Tree Trails a reality for students. A final Tree Trails Project Field Test report was provided to TUFC and TFS.

A committee of TFS and TUFC members and Tree Trails Project Field Test coordinators developed a plan for future implementation.

II. PROCEDURES

Recruitment

Recruitment for the Tree Trails Project Field Test began in spring 2013 with a plan to invite volunteer fifth-grade teachers in the Greater Houston Area to participate in the testing of 10 modules and materials. Coordinators contacted key personnel in Houston area school districts and private schools via email and phone calls to ascertain interest in participation in the Tree Trails Project Field Test; i.e., administrators, science coordinators, principals, teacher leaders and retired administrators. During spring and summer 2013, Local Education Agencies were provided with a letter (Appendix A) as an invitation to participate and overview (Appendix B) of the Tree Trails Project Field Test.

Participants

A list of teachers, schools and districts was generated from which 10 teachers were selected and notified. Seven fifth-grade teachers implemented three – five modules with 272 students and submitted teacher and student data. One eighth-grade teacher implemented three modules with 60 students and submitted data. These teachers are highlighted in bold. Three teachers were unable to submit any information documenting implementation of the field test.

Houston ISD participants:

- **Love Elementary, 2 teachers, 2 classes, 30 students**
- Felix Cook Elementary, 1 teacher, 1 class
- Lockhart Elementary, 1 teacher, 1 class

Clear Creek ISD participants:

- **LaVace Stewart Elementary, 1 teacher, 3 classes, 50 students**
- **McWhirter Elementary, 1 teacher, 3 classes, 45 students**
- **Mossman Elementary, 1 teacher, 5 classes, 77 students**
- Mossman Elementary, 1 teacher, 4 classes

University of Houston Charter School participant:

- **UH Charter School, 1 teacher, 1 class, 35 students**

First Baptist Christian Academy participant:

- **1 teacher, 2 classes, 35 students**

East Chambers ISD participant:

- **1 teacher, eighth-grade, 3 classes, 60 students**

School Demographics

The Texas Education Agency 2012 – 13 School Report Card provides the following information regarding each public school's demographics. Private school demographics were not available. This information is useful to determine the success of the Tree Trails Project Field Test with a wide variety of the student population.

School	Attendance (%)	Race/Ethnicity (%)	Eco/Disadv. (%)	ESL (%)	Sp. Edu (%)	Mobility (%)
Love	97.8	Hispanic 87.9 Other 13.1	91.1	49.3	8.3	12.7
Stewart	96.5	Hispanic 51.2 White 40.2 Other 8.6	59.9	39.9	10.4	15.5
McWhirter	96.8	Hispanic 68.2 White 12.4 African Am 15.8 Other 3.6	75.7	49.6	9.8	22.6
Mossman	97.0	Hispanic 17.7 White 66.8 African Am 6.9 Other 8.6	14.8	6.0	8.0	8.6
E.C. Jr. Hi.	96.8	Hispanic 31.6 White 54.1 African Am 10.7 Other 3.6	58.2	9.7	10.7	10.5

The demographics clearly show that the student population met the field test plan to involve students' representative of the state's diverse school population: ethnic diversity, economic disadvantage and academic performance.

Agreement and Stipend

The Overview of the Tree Trails Project Field Test sent to local education agencies in spring and summer of 2013, asked for a maximum of two 5th grade teachers per school to agree to

complete "10 lesson modules, teacher and student evaluations, and teacher recommendations and suggestions." Their rewards were free training and materials and a $500 stipend. The agreement was via email and teachers were required to obtain approval from their principals to implement the Tree Trails Project Field Test.

The list of approved field test teachers' information allowed the coordinators to maintain contact during summer 2013. Ideal training dates and times were submitted by teachers. However, the Tree Trails Project Field Test was delayed by unforeseen software application issues until spring 2014. During the fall 2013, coordinators maintained contact with the teachers.

As a result of the delay, the agreement to implement 10 modules was changed to a more reasonable requirement; i.e., implement modules one, two, three and ten and send related evaluative information. Although the requirement was changed, the timeframe to implement was still restrictive and some teachers were able to implement only a few, if any, modules. Seven fifth-grade teachers and one eighth-grade teacher were rewarded a certificate of participation and a $500 stipend.

III. PROJECT IMPLEMENTATION

Training

Training began on February 22, 2014 from 9 – 11 a.m. at University of Houston Charter School with three teachers attending. Training continued at LaVace Stewart Elementary in Clear Creek ISD from 1 – 3 p.m. with three teachers attending. Two Tree Trails Project coordinators, one TFS Houston forester attended the morning and afternoon sessions and two TUFC members and a guest joined the afternoon session. During March 2014, additional training for the remaining teachers was conducted at their respective schools. All teachers were provided with materials consisting of a printed Tree Trails Handbook, one set of tree cookies, a 300-foot measuring tape, a classroom set of flash drives, student folders and "Tree Trails" and "I Love Baby Trees" stickers. During all training sessions the leaders discussed and demonstrated the websites, the module's format and instructional procedures, student pretests and posttests, teacher surveys, and reviewed teacher stipend and requirements and contact information. During the February 22 meetings, the TFS representative provided a demonstration of the first module: Map a Tree Trail. Teachers discussed and made preliminary plans for implementation in their classrooms. A question and answer conversation concluded these training sessions. (Appendix C, Teacher Training Agenda)

Implementation

Implementation with students in most classrooms began after their April testing. Some teachers began implementation after the State of Texas Assessments of Academic Readiness

(STAAR) Reading and Mathematics testing April 1 and 2, 2014. Others implemented after the fifth-grade STAAR Science test on April 23, 2014.

Implications

Due to the limited timeframe, teachers found it difficult to implement the Tree Trails Project Field Test as initially planned: employing each of the instructional procedures in the 5E's format, providing student self-assessment activities and journal entries, administering the student pretests and posttests, and the teacher surveys. Teachers reported that, in addition to the time constraints for implementing the modules as designed, their ability to allow students to take the pretests and posttests and use the internet for online activities were limited by computer access. Additionally, at least four classrooms had only two to three computers to share, creating limited use of the online activities. The issues teachers and students confronted due to limited calendar time and limited computer access resulted in limited feedback from students and teachers.

IV. FORMATIVE ASSESSMENTS AND RESULTS

Formative assessments are ongoing measures of student progress and teacher instructional delivery during the implementation process. These may be used to provide feedback during the instruction, may be used to make adjustments as needed and give input for decision making to revise, modify and make adjustments as needed. The student pretests and posttests (Appendix D) and the teacher evaluations (Appendix E) for each module are the major instruments used in this report. These are both qualitative (objective-based) and quantitative (subjective oriented).

Ongoing Communication

During the training sessions, coordinators stressed the value and need for ongoing communication regarding implementation of the modules with students, the modules design, clarity, grade level appropriateness, instructional methods, evaluation techniques, technology application, materials, curriculum integration, correlation with state mandates, etc. Teachers were encouraged to email, call, or use any method to communicate their needs, offer their comments, make adjustments to the projects and/or request other types of assistance for the success of the Tree Trails Project Field Test. Many teachers did respond to communication with the coordinators. Phone calls were not recorded but most callers responded with follow-up emails.

Student Pretests and Posttests

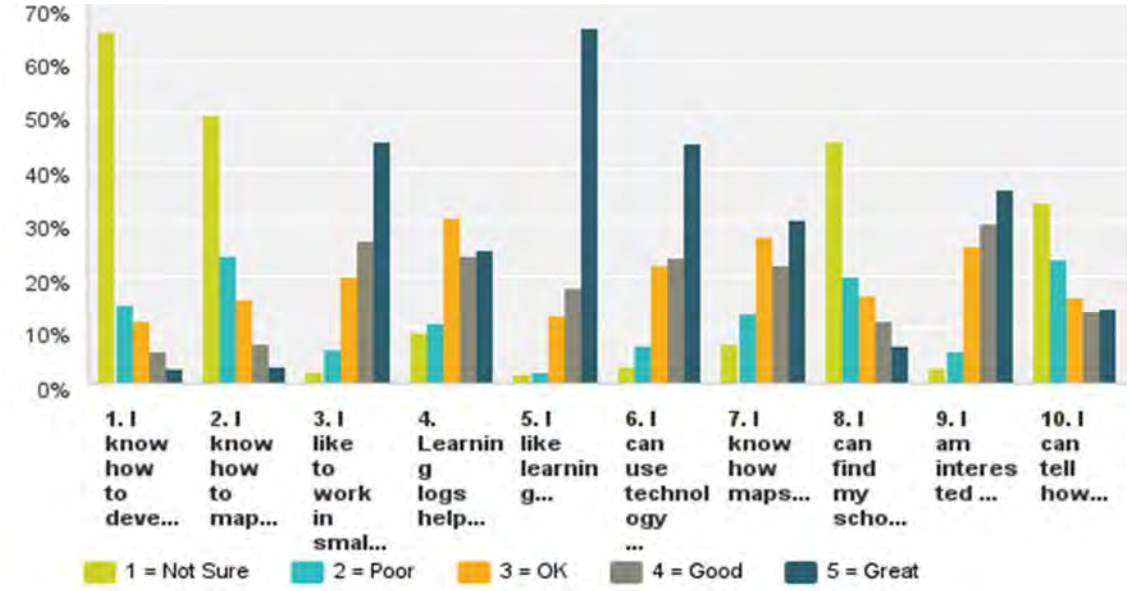
The purpose of the student pretests and posttests were to serve as an assessment of student prior knowledge of the content in any module, thereby providing a tool teachers could use to prioritize the instructional needs for the class, find individual student needs, ascertain what objectives needed to be retaught/extended, and assist in developing or changing appropriate

grouping patterns. In addition, students were provided with the powerful instructional tool of a self-assessment to determine what they already knew about the modules objectives, what they needed to know, and what they learned. Coordinators would benefit by using the results of item analysis to modify objectives, instructional procedures, activities, and evaluation methods.

Teachers sent student pretests and posttests via the online program SurveyMonkey and/or hard copies of the tests they collected. The teachers who provided their printed collection of student pretests and posttests informed the coordinators about the collection submitted; i.e., limited number of students took both the pretests and posttests for the modules they completed due to limited time to take the tests. In some instances, the teacher's choice was to have students take the pretests and posttests for each module or to eliminate administration of the pretests and posttests. This report includes the results of the student pretests and posttests for each of the modules that were submitted:

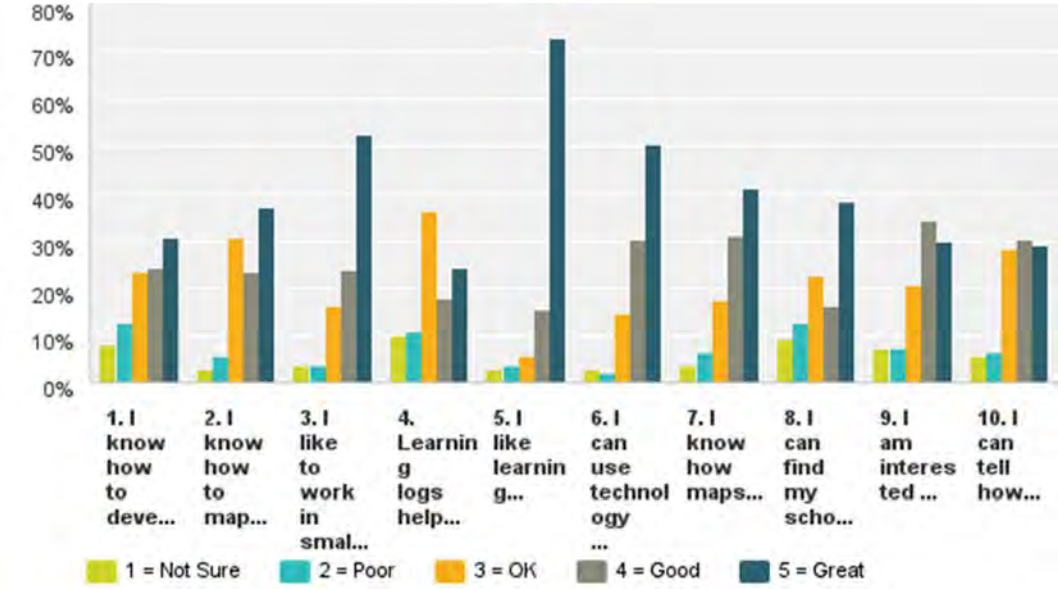
Module One: Map a Tree Trail
Module Two: Tree Identification
Module Three: Tree Measurement
Module Four: Tree Structure and Function
Module Five: Benefits and Values of Trees
Module Ten: Student Service Leader

MODULE ONE: MAP A TREE TRAIL
Pretest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I know how to develop a tree trail.	65.26% 124	14.74% 28	11.58% 22	5.79% 11	2.63% 5	190
2. I know how to map trees on a tree trail.	49.74% 94	23.81% 45	15.87% 30	7.41% 14	3.17% 6	189
3. I like to work in small groups to learn.	2.12% 4	6.35% 12	20.11% 38	26.46% 50	44.97% 85	189
4. Learning logs helps me use what I learn.	9.52% 18	11.11% 21	30.69% 58	23.81% 45	24.87% 47	189
5. I like learning activities that are outside.	1.58% 3	2.11% 4	12.63% 24	17.89% 34	65.79% 125	190
6. I can use technology to learn about trees.	3.17% 6	6.88% 13	22.22% 42	23.28% 44	44.44% 84	189
7. I know how maps tell us about our land.	7.49% 14	12.83% 24	27.27% 51	21.93% 41	30.48% 57	187
8. I can find my school online on the Texas Forest Information website.	44.97% 85	20.11% 38	16.40% 31	11.64% 22	6.88% 13	189
9. I am interested in knowing more about trees.	2.66% 5	5.85% 11	25.53% 48	29.79% 56	36.17% 68	188
10. I can tell how Texas A&M Forest Service helps student's learn about our trees & forests.	33.69% 63	22.99% 43	16.04% 30	13.37% 25	13.90% 26	187

Posttest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I know how to develop a tree trail.	**8.18%** 9	**12.73%** 14	**23.64%** 26	**24.55%** 27	**30.91%** 34	110
2. I know how to map trees on a tree trail.	**2.73%** 3	**5.45%** 6	**30.91%** 34	**23.64%** 26	**37.27%** 41	110
3. I like to work in small groups to learn.	**3.67%** 4	**3.67%** 4	**16.51%** 18	**23.85%** 26	**52.29%** 57	109
4. Learning logs helps me use what I learn.	**10.00%** 11	**10.91%** 12	**36.36%** 40	**18.18%** 20	**24.55%** 27	110
5. I like learning activities that are outside.	**2.73%** 3	**3.64%** 4	**5.45%** 6	**15.45%** 17	**72.73%** 80	110
6. I can use technology to learn about trees.	**2.75%** 3	**1.83%** 2	**14.68%** 16	**30.28%** 33	**50.46%** 55	109
7. I know how maps tell us about our land.	**3.67%** 4	**6.42%** 7	**17.43%** 19	**31.19%** 34	**41.28%** 45	109
8. I can find my school online on the Texas Forest Information website.	**9.17%** 10	**12.84%** 14	**22.94%** 25	**16.51%** 18	**38.53%** 42	109
9. I am interested in knowing more about trees.	**7.27%** 8	**7.27%** 8	**20.91%** 23	**34.55%** 38	**30.00%** 33	110
10. I can tell how Texas A&M Forest Service helps student's learn about our trees & forests.	**5.50%** 6	**6.42%** 7	**28.44%** 31	**30.28%** 33	**29.36%** 32	109

Module One Pretest and Posttest Comparison

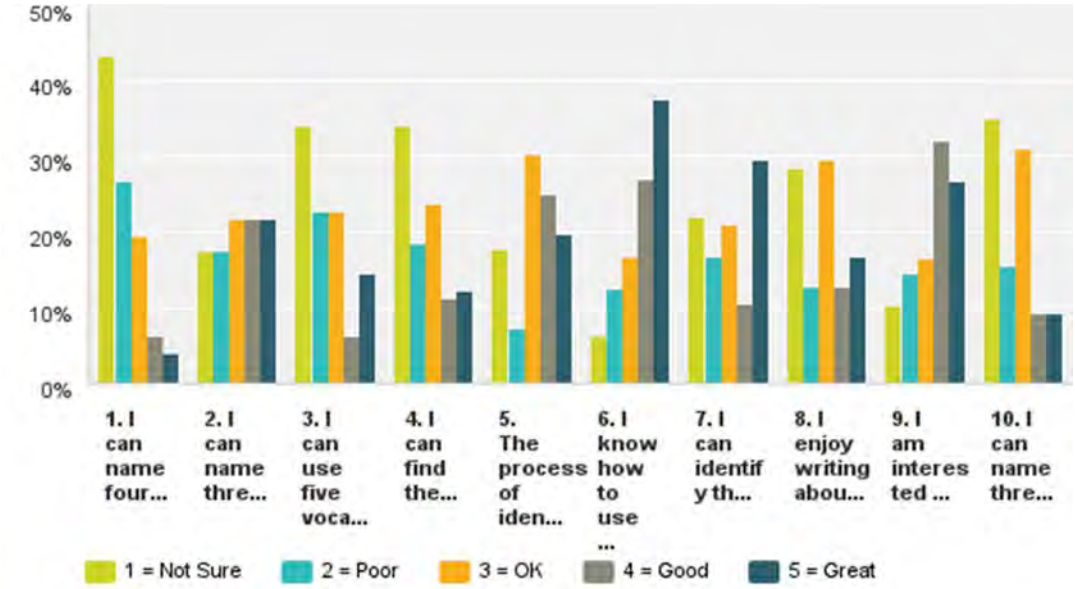
Percentage Increase (+) or Decrease (-)in combined percent of Good and Great to reflect learning of concepts and objectives:

Statement	Pretests %	Posttests %	(+)Increase or (-) Decrease %
1. I know how to develop a Tree Trail.	8.42	55.47	+4.75
2. I know how to map trees on a Tree Trail.	10.58	6.91	+50.33
3. I like to work in small groups to learn.	71.43	76.14	+4.71
4. Learning logs help me use what I learn.	48.68	42.73	-5.95
5. I like learning activities that are outside.	67.68	88.18	+20.5
6. I can use technology to learn about trees.	67.72	80.74	+13.02
7. I know how maps tell us about our land.	52.41	72.47	+20.06
8. I can find my school online on Texas Forest Information website.	18.52	55.04	+36.52
9. I am interested in knowing more about trees.	65.96	64.55	-1.41
10. I can tell how Texas A&M Forest Service helps students' learn about our trees & forests.	27.27	59.64	+32.37

Module One Comments:
Students participating in the Module One pretest numbered 190 and for the posttest the number was 110. The results indicate all student responses to Good or Great increased in eight of the 10 question statements. The increase was as much as 50.33 percent in the statement "I know how to map trees on a tree trail." This gain is evidence that students responding attained the goal and objectives for Module One.

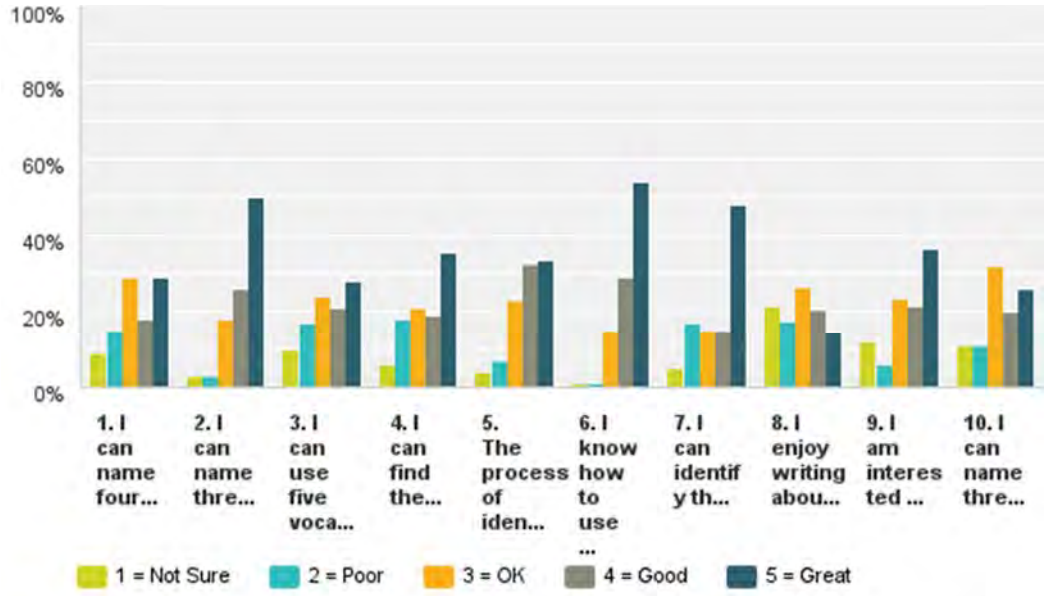
Two statements showed a lesser response to Good or Great: -5.94 percent to the statement "Learning logs helps me use what I learn" and -1.41 percent to the statement "I am interested in knowing more about trees." The decrease could be due to limited computer access, limited time to develop learning logs and/or lack of time to become more involved in the project. This situation may have led to less interest in learning about trees. Any conclusion must take into account the timeframe, computer access and student participation that influenced significant results.

MODULE TWO: TREE IDENTIFICATION
Pretest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can name four steps to identify my Trail Tree.	43.30% 42	26.80% 26	19.59% 19	6.19% 6	4.12% 4	97
2. I can name three ways to be safe when I collect leaves.	17.53% 17	17.53% 17	21.65% 21	21.65% 21	21.65% 21	97
3. I can use five vocabulary words to describe leaves.	34.02% 33	22.68% 22	22.68% 22	6.19% 6	14.43% 14	97
4. I can find the common and scientific name of trees.	34.02% 33	18.56% 18	23.71% 23	11.34% 11	12.37% 12	97
5. The process of identifying different trees helps me become a better scientist.	17.71% 17	7.29% 7	30.21% 29	25.00% 24	19.79% 19	96
6. I know how to use the internet to identify trees.	6.25% 6	12.50% 12	16.67% 16	27.08% 26	37.50% 36	96
7. I can identify three different trees.	22.11% 21	16.84% 16	21.05% 20	10.53% 10	29.47% 28	95
8. I enjoy writing about the trees.	28.42% 27	12.63% 12	29.47% 28	12.63% 12	16.84% 16	95
9. I am interested in learning more about about different trees.	10.31% 10	14.43% 14	16.49% 16	31.96% 31	26.80% 26	97
10. I can name three ways Texas A&M Forest Service helps me gain more knowledge about trees.	35.05% 34	15.46% 15	30.93% 30	9.28% 9	9.28% 9	97

Posttest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can name four steps to identify my Trail Tree.	9.00% 9	15.00% 15	29.00% 29	18.00% 18	29.00% 29	100
2. I can name three ways to be safe when I collect leaves.	3.00% 3	3.00% 3	18.00% 18	26.00% 26	50.00% 50	100
3. I can use five vocabulary words to describe leaves.	10.00% 10	17.00% 17	24.00% 24	21.00% 21	28.00% 28	100
4. I can find the common and scientific name of trees.	6.06% 6	18.18% 18	21.21% 21	19.19% 19	35.35% 35	99
5. The process of identifying different trees helps me become a better scientist.	4.04% 4	7.07% 7	23.23% 23	32.32% 32	33.33% 33	99
6. I know how to use the internet to identify trees.	1.00% 1	1.00% 1	15.00% 15	29.00% 29	54.00% 54	100
7. I can identify three different trees.	5.00% 5	17.00% 17	15.00% 15	15.00% 15	48.00% 48	100
8. I enjoy writing about the trees.	21.43% 21	17.35% 17	26.53% 26	20.41% 20	14.29% 14	98
9. I am interested in learning more about about different trees.	12.24% 12	6.12% 6	23.47% 23	21.43% 21	36.73% 36	98
10. I can name three ways Texas A&M Forest Service helps me gain more knowledge about trees.	11.00% 11	11.00% 11	32.00% 32	20.00% 20	26.00% 26	100

Module Two Pretest and Posttest Comparison

Percentage Increase (+) or Decrease (-) in combined percent of Good and Great to reflect learning of concepts and objectives.

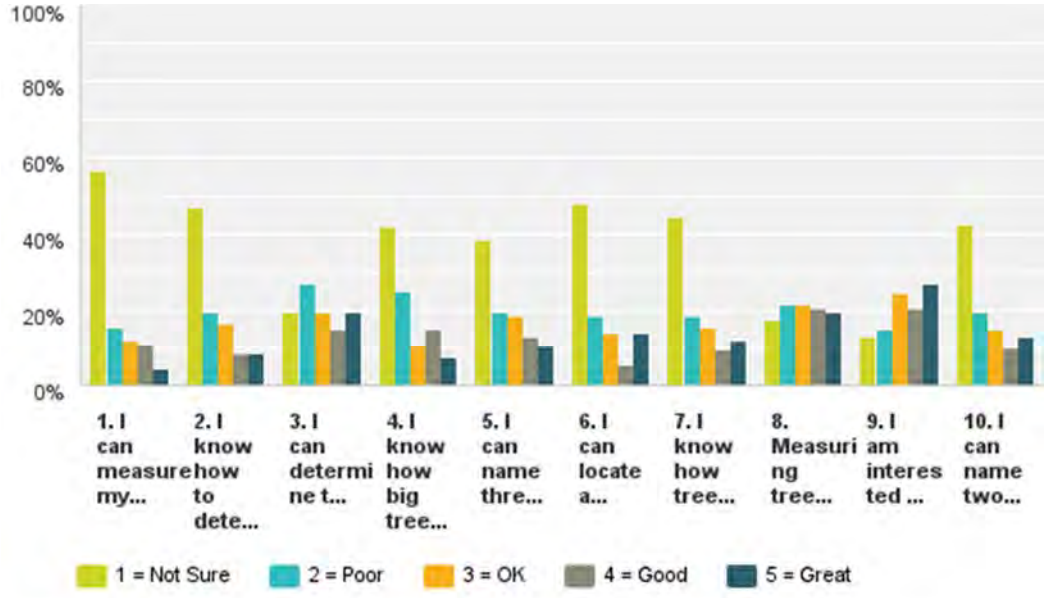
Statement	Pretests %	Posttests %	(+)Increase or (-) Decrease %
1. I can name four steps to identify my Trail Tree.	10.31	29.18	+18.87
2. I can name three ways to be safe when I collect leaves.	43.3	76.0	+32.7
3. I can use five vocabulary words to describe leaves.	20.62	49.0	+25.29
4. I can find the common and scientific name of trees.	23.71	54.54	+30.83
5. The process of identifying different trees helps me become a better scientist.	44.29	65.65	+20.86
6. I know how to use the internet to identify trees.	64.58	83.0	+18.42
7. I can identify three different trees.	40.0	63.0	+23.0
8. I enjoy writing about the trees.	29.47	34.7	+5.23
9. I am interested in learning more about different trees.	58.76	58.16	-0.6
10. I can name three ways Texas A&M Forest Service helps me gain more knowledge about trees.	18.56	46	+27.44

Module Two Comments:

Notable increases in student learning are observed with statement no. 2 “I can name three ways to be safe when collecting trees.” And statement no. 4 “I can find the common and scientific name of trees.” Both concepts were important objectives of this module. It is noteworthy to acknowledge that students knew before instruction that using the internet would be important to the identification of trees (no. 6 “I know how to use the internet to identify trees”). The one negative result reflects the students’ interest in learning more about trees prior to instruction was over 50 percent and decreased only 0.6 percent after instruction. Limited instructional time may have been an issue for student completion of some of the activities such as writing about trees.

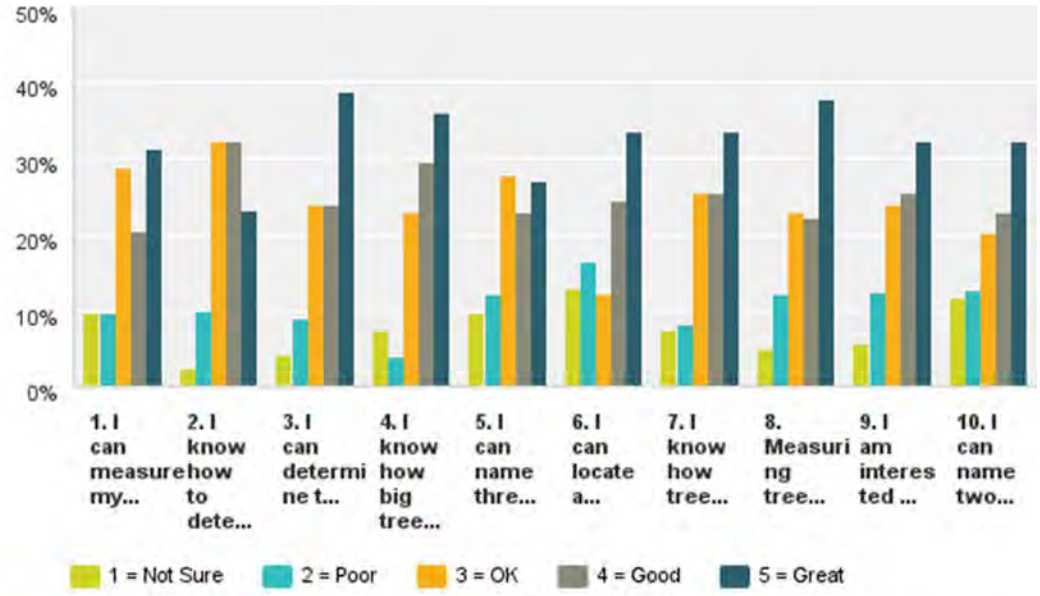
While there were a limited number of students participating in the pretests and posttests, those who did participate did provide educators with valuable information to address the student involvement, interests, and student centered instructional settings.

MODULE THREE: TREE MEASUREMENT
Pretest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can measure my Trail Tree the forester's way.	**56.48%** 61	**15.74%** 17	**12.04%** 13	**11.11%** 12	**4.63%** 5	108
2. I know how to determine which technique to use to measure my Trail Tree.	**47.22%** 51	**19.44%** 21	**16.67%** 18	**8.33%** 9	**8.33%** 9	108
3. I can determine the condition of a Trail Tree.	**19.44%** 21	**26.85%** 29	**19.44%** 21	**14.81%** 16	**19.44%** 21	108
4. I know how big trees are measured.	**42.06%** 45	**25.23%** 27	**10.28%** 11	**14.95%** 16	**7.48%** 8	107
5. I can name three reasons why foresters measure trees.	**38.32%** 41	**19.63%** 21	**18.69%** 20	**13.08%** 14	**10.28%** 11	107
6. I can locate a Champion Tree in Texas.	**48.15%** 52	**18.52%** 20	**13.89%** 15	**5.56%** 6	**13.89%** 15	108
7. I know how tree measurement data is entered on the Tree Trail website.	**44.44%** 48	**18.52%** 20	**15.74%** 17	**9.26%** 10	**12.04%** 13	108
8. Measuring trees is an important step in preserving our forests.	**17.59%** 19	**21.30%** 23	**21.30%** 23	**20.37%** 22	**19.44%** 21	108
9. I am interested in knowing more about what I can do to keep my trail tree in the best condition.	**13.08%** 14	**14.95%** 16	**24.30%** 26	**20.56%** 22	**27.10%** 29	107
10. I can name two ways Texas A&M Forest Service teaches me about tree measurement.	**42.59%** 46	**19.44%** 21	**14.81%** 16	**10.19%** 11	**12.96%** 14	108

Posttest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can measure my Trail Tree the forester's way.	9.84% 12	9.84% 12	28.69% 35	20.49% 25	31.15% 38	122
2. I know how to determine which technique to use to measure my Trail Tree.	2.48% 3	9.92% 12	32.23% 39	32.23% 39	23.14% 28	121
3. I can determine the condition of a Trail Tree.	4.13% 5	9.09% 11	23.97% 29	23.97% 29	38.84% 47	121
4. I know how big trees are measured.	7.38% 9	4.10% 5	22.95% 28	29.51% 36	36.07% 44	122
5. I can name three reasons why foresters measure trees.	9.84% 12	12.30% 15	27.87% 34	22.95% 28	27.05% 33	122
6. I can locate a Champion Tree in Texas.	13.11% 16	16.39% 20	12.30% 15	24.59% 30	33.61% 41	122
7. I know how tree measurement data is entered on the Tree Trail website.	7.38% 9	8.20% 10	25.41% 31	25.41% 31	33.61% 41	122
8. Measuring trees is an important step in preserving our forests.	4.92% 6	12.30% 15	22.95% 28	22.13% 27	37.70% 46	122
9. I am interested in knowing more about what I can do to keep my trail tree in the best condition.	5.79% 7	12.40% 15	23.97% 29	25.62% 31	32.23% 39	121
10. I can name two ways Texas A&M Forest Service teaches me about tree measurement.	11.86% 14	12.71% 15	20.34% 24	22.88% 27	32.20% 38	118

Module Three Pretest and Posttest Comparison

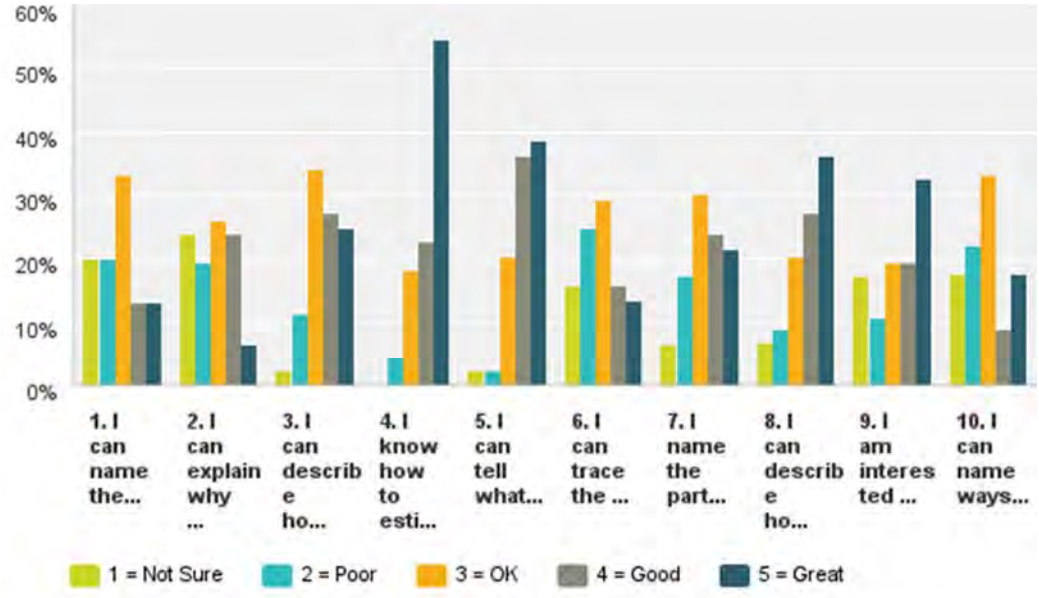
Percentage Increase (+) or Decrease (-) in combined percent of Good and Great to reflect learning of concepts and objectives.

Statement	Pretests %	Posttests %	(+)Increase or (-) Decrease %
1. I can measure my Tree Trail the forester's way.	15.74	51.64	+35.9
2. I know how to determine which technique to use to measure my Trail Tree.	16.66	55.37	+38.71
3. I can determine the condition of a Trail Tree.	26.25	62.71	+36.46
4. I know how big trees are measured.	22.43	65.58	+43.15
5. I can name three reasons why foresters measure trees.	23.36	50.	+26.64
6. I can locate a Champion Tree in Texas.	19.45	58.2	+38.75
7. I know how tree measurement data is entered on the Tree Trail website.	21.3	59.02	+37.72
8. Measuring trees is an important step in preserving our forests.	39.81	59.83	+20.02
9. I am interested in knowing more about what I can do to keep my trail tree in the best condition.	47.44	59.87	+10.43
10. I can name two ways Texas A&M Forest Service teaches me about tree measurement.	23.15	55.08	+31.93

Module Three Comments:

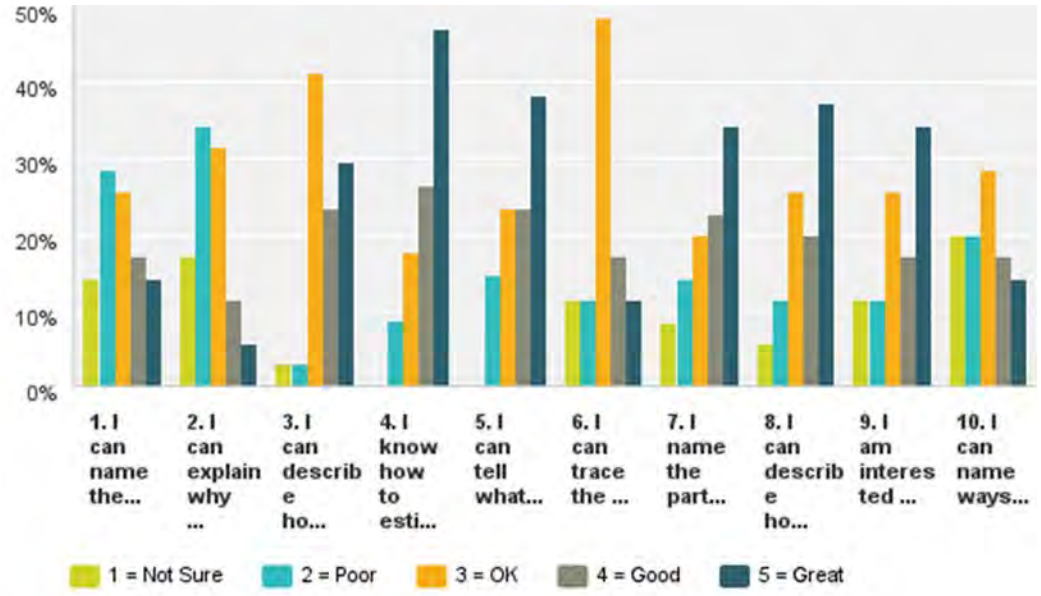
Results appear to favor increased knowledge in applying measurement methods, determining a tree condition, and the criteria to complete and publish a tree trail. All posttests statements resulted in increased knowledge of 10.43 percent to 43.15 percent. The increase in student knowledge as self-assessed by students should be contributed to teachers' instructional procedures and attention to obtaining the goals and objectives of Module Three. Even though the population was small, it does represent a cross section of Texas student diversity in ethnicity, socioeconomic status, and academic performance.

MODULE FOUR: TREE STRUCTURE AND FUNCTION
Pretest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can name the parts of a tree trunk and the function of each part.	20.00% 9	20.00% 9	33.33% 15	13.33% 6	13.33% 6	45
2. I can explain why a tree cross section is an important resource for foresters.	23.91% 11	19.57% 9	26.09% 12	23.91% 11	6.52% 3	46
3. I can describe how a tree grows.	2.27% 1	11.36% 5	34.09% 15	27.27% 12	25.00% 11	44
4. I know how to estimate the age of a tree.	0.00% 0	4.55% 2	18.18% 8	22.73% 10	54.55% 24	44
5. I can tell what a tree needs to grow.	2.27% 1	2.27% 1	20.45% 9	36.36% 16	38.64% 17	44
6. I can trace the way food gets to the tree parts.	15.91% 7	25.00% 11	29.55% 13	15.91% 7	13.64% 6	44
7. I name the parts of a tree that help protect it.	6.52% 3	17.39% 8	30.43% 14	23.91% 11	21.74% 10	46
8. I can describe how a tree makes its food.	6.82% 3	9.09% 4	20.45% 9	27.27% 12	36.36% 16	44
9. I am interested in knowing more about a trees structure and function.	17.39% 8	10.87% 5	19.57% 9	19.57% 9	32.61% 15	46
10. I can name ways Texas A&M Forest Service helps me learn about the function and structure of trees.	17.78% 8	22.22% 10	33.33% 15	8.89% 4	17.78% 8	45

Posttest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can name the parts of a tree trunk and the function of each part.	14.29% 5	28.57% 10	25.71% 9	17.14% 6	14.29% 5	35
2. I can explain why a tree cross section is an important resource for foresters.	17.14% 6	34.29% 12	31.43% 11	11.43% 4	5.71% 2	35
3. I can describe how a tree grows.	2.94% 1	2.94% 1	41.18% 14	23.53% 8	29.41% 10	34
4. I know how to estimate the age of a tree.	0.00% 0	8.82% 3	17.65% 6	26.47% 9	47.06% 16	34
5. I can tell what a tree needs to grow.	0.00% 0	14.71% 5	23.53% 8	23.53% 8	38.24% 13	34
6. I can trace the way food gets to the tree parts.	11.43% 4	11.43% 4	48.57% 17	17.14% 6	11.43% 4	35
7. I name the parts of a tree that help protect it.	8.57% 3	14.29% 5	20.00% 7	22.86% 8	34.29% 12	35
8. I can describe how a tree makes its food.	5.71% 2	11.43% 4	25.71% 9	20.00% 7	37.14% 13	35
9. I am interested in knowing more about a trees structure and function.	11.43% 4	11.43% 4	25.71% 9	17.14% 6	34.29% 12	35
10. I can name ways Texas A&M Forest Service helps me learn about the function and structure of trees.	20.00% 7	20.00% 7	28.57% 10	17.14% 6	14.29% 5	35

Module Four Pretest and Posttest Comparison

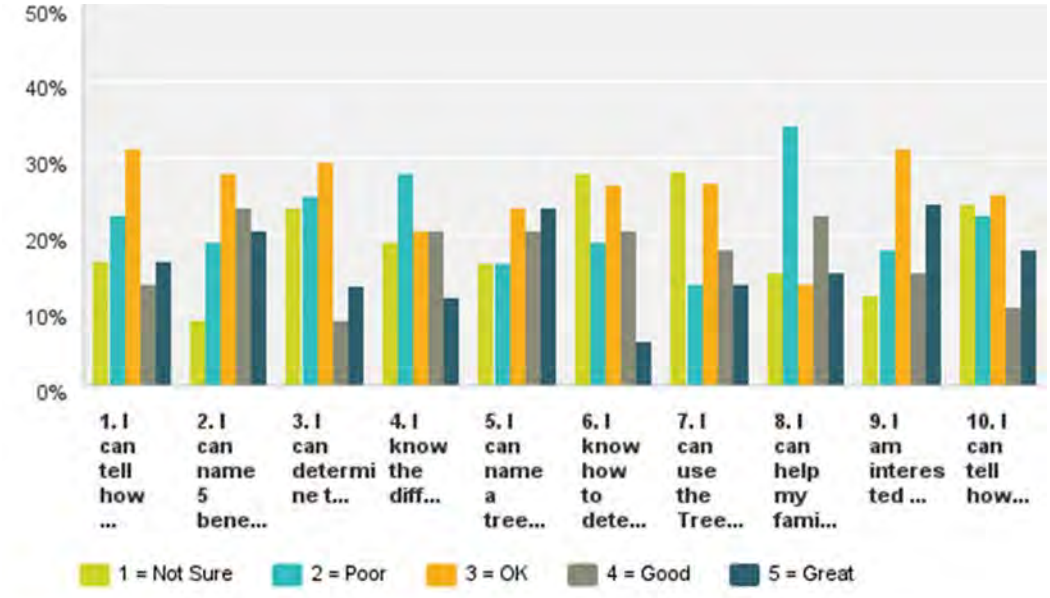
Percentage Increase (+) or Decrease (-) in combined percent of Good and Great to reflect learning of concepts and objectives.

Statement	Pretests %	Posttests%	(+)Increase or (-) Decrease%
1. I can name the parts of a tree trunk and the function of each part.	26.66	31.43	+4.77
2. I can explain why a tree cross section is an important resource for foresters.	30.43	17.14	-13.29
3. I can describe how a tree grows.	52.27	52.9	+.71
4. I know how to estimate the age of a tree.	77.28	73.53	-3.75
5. I can tell what a tree needs to grow.	74.9	61.77	-13.13
6. I can trace the way food gets to the tree parts.	29.55	28.57	-.98
7. I can name the parts of a tree that helps protect it.	45.65	57.15	+11.5
8. I can describe how a tree makes its food.	63.63	57.14	-6.22
9. I am interested in knowing more about a tree's structure and function.	47.18	51.43	+4.25
10. I can name ways TFS helps me learn about the function and structure of trees.	26.67	31.43	+4.76

Module Four Comments:

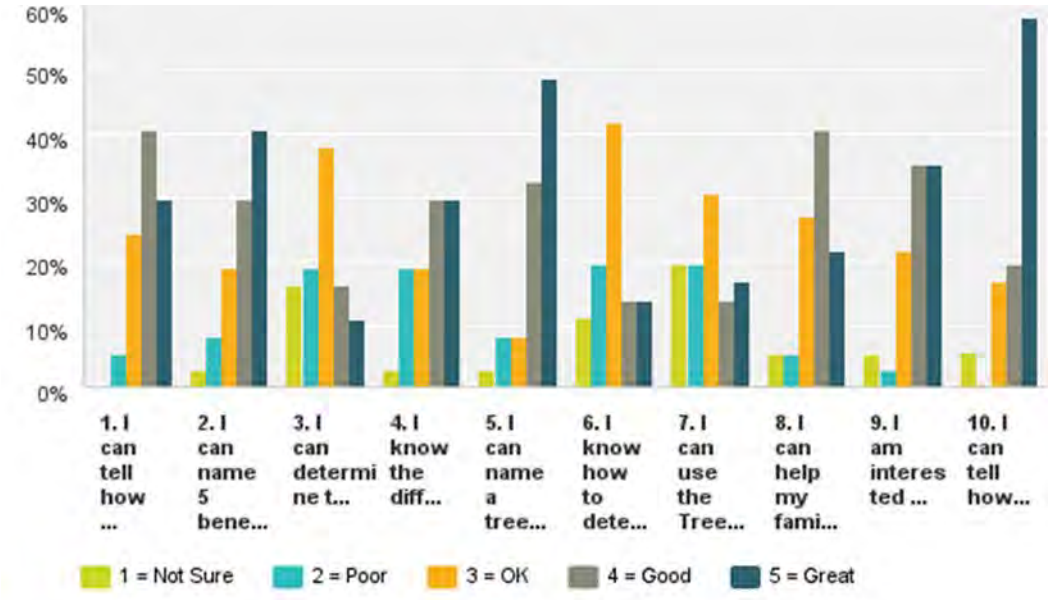
The results of the students' self-assessment of their knowledge about the structure of trees prior to and after instruction are a bit confusing. It appears that students' felt they knew more about the topic in most statements than before instruction. After instruction, students' posttests appear to know less. It is not clear if the results call for additional or extended instruction in areas showing less gain or if students simply felt they knew more before and felt less adequate after instruction. The results do reflect the importance for teachers to use the pretests and posttests as a tool to determine student instructional needs and use the results to adjust their instructional focus for students.

MODULE FIVE: BENEFITS AND VALUES OF TREES
Pretest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can tell how my Trail Tree benefits our school.	16.42% 11	22.39% 15	31.34% 21	13.43% 9	16.42% 11	67
2. I can name 5 benefits trees provide.	8.82% 6	19.12% 13	27.94% 19	23.53% 16	20.59% 14	68
3. I can determine the dollar value a tree would add to property.	23.53% 16	25.00% 17	29.41% 20	8.82% 6	13.24% 9	68
4. I know the difference between benefits and value.	19.12% 13	27.94% 19	20.59% 14	20.59% 14	11.76% 8	68
5. I can name a tree part and a benefit it provides.	16.18% 11	16.18% 11	23.53% 16	20.59% 14	23.53% 16	68
6. I know how to determine my Trail Tree's value.	27.94% 19	19.12% 13	26.47% 18	20.59% 14	5.88% 4	68
7. I can use the Tree Trail website to calculate the value of trees at home or a friend's home.	28.36% 19	13.43% 9	26.87% 18	17.91% 12	13.43% 9	67
8. I can help my family learn more about the benefits and value of trees.	14.93% 10	34.33% 23	13.43% 9	22.39% 15	14.93% 10	67
9. I am interested in knowing how I can maintain and improve the value of our Trail Trees.	11.94% 8	17.91% 12	31.34% 21	14.93% 10	23.88% 16	67
10. I can tell how Texas A&M Forest Service helps me learn about the benefits & values of trees.	23.88% 16	22.39% 15	25.37% 17	10.45% 7	17.91% 12	67

Posttest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can tell how my Trail Tree benefits our school.	0.00% 0	5.41% 2	24.32% 9	40.54% 15	29.73% 11	37
2. I can name 5 benefits trees provide.	2.70% 1	8.11% 3	18.92% 7	29.73% 11	40.54% 15	37
3. I can determine the dollar value a tree would add to property.	16.22% 6	18.92% 7	37.84% 14	16.22% 6	10.81% 4	37
4. I know the difference between benefits and value.	2.70% 1	18.92% 7	18.92% 7	29.73% 11	29.73% 11	37
5. I can name a tree part and a benefit it provides.	2.70% 1	8.11% 3	8.11% 3	32.43% 12	48.65% 18	37
6. I know how to determine my Trail Tree's value.	11.11% 4	19.44% 7	41.67% 15	13.89% 5	13.89% 5	36
7. I can use the Tree Trail website to calculate the value of trees at home or a friend's home.	19.44% 7	19.44% 7	30.56% 11	13.89% 5	16.67% 6	36
8. I can help my family learn more about the benefits and value of trees.	5.41% 2	5.41% 2	27.03% 10	40.54% 15	21.62% 8	37
9. I am interested in knowing how I can maintain and improve the value of our Trail Trees.	5.41% 2	2.70% 1	21.62% 8	35.14% 13	35.14% 13	37
10. I can tell how Texas A&M Forest Service helps me learn about the benefits & values of trees.	5.56% 2	0.00% 0	16.67% 6	19.44% 7	58.33% 21	36

Module Five Pretest and Posttest Comparison

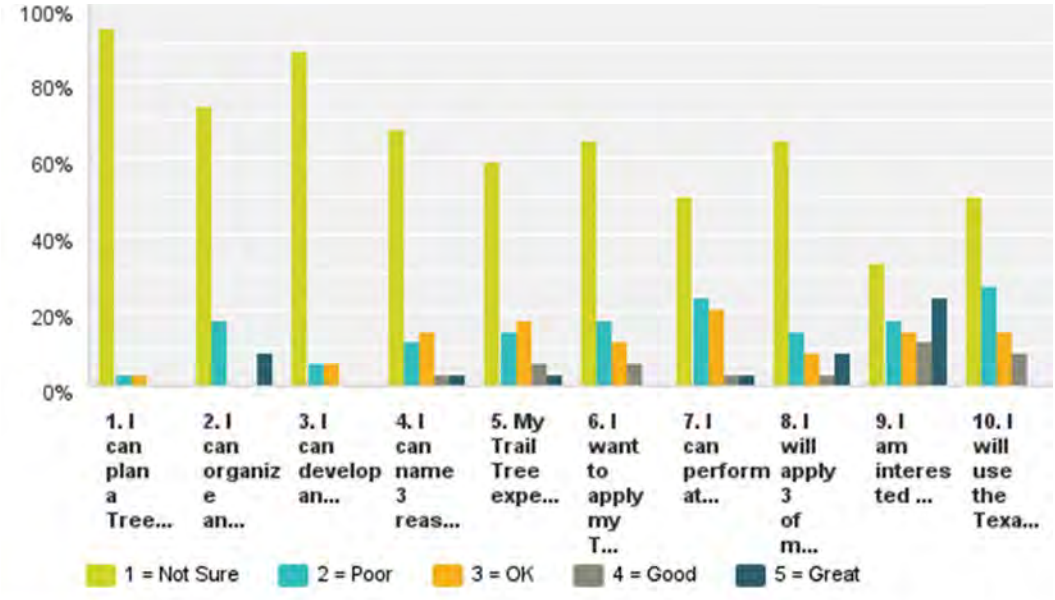
Percentage Increase (+) or Decrease (-) in combined percent of Good and Great to reflect learning of concepts and objectives.

Statement	Pretests %	Posttests%	(+)Increase or (-) Decrease%
1. I can tell how my Trail Tree benefits our school.	29.85	78.27	+40.42
2. I can name 5 benefits trees provide.	44.16	70.27	+26.11
3. I can determine the dollar value a tree would add to property.	22.56	27.03	+4.47
4. I know the difference between benefits and value.	32.35	59.46	+27.11
5. I can name a tree part and a benefit it provides.	44.12	81.12	+37.
6. I know how to determine my Trail Tree's value.	26.47	27.78	+1.31
7. I can use the Tree Trail website to calculate the value of trees at home or a friend's home.	31.34	30.56	-.78
8. I can help my family learn more about the benefits and value of trees.	37.32	70.78	+32.96
9. I am interested in knowing how I can maintain and improve the value of our Trail Trees.	38.41	70.28	+31.87
10. I can tell how TFS helps me learn about the benefits & values of trees.	28.36	71.77	+43.41

Module Five Comments:

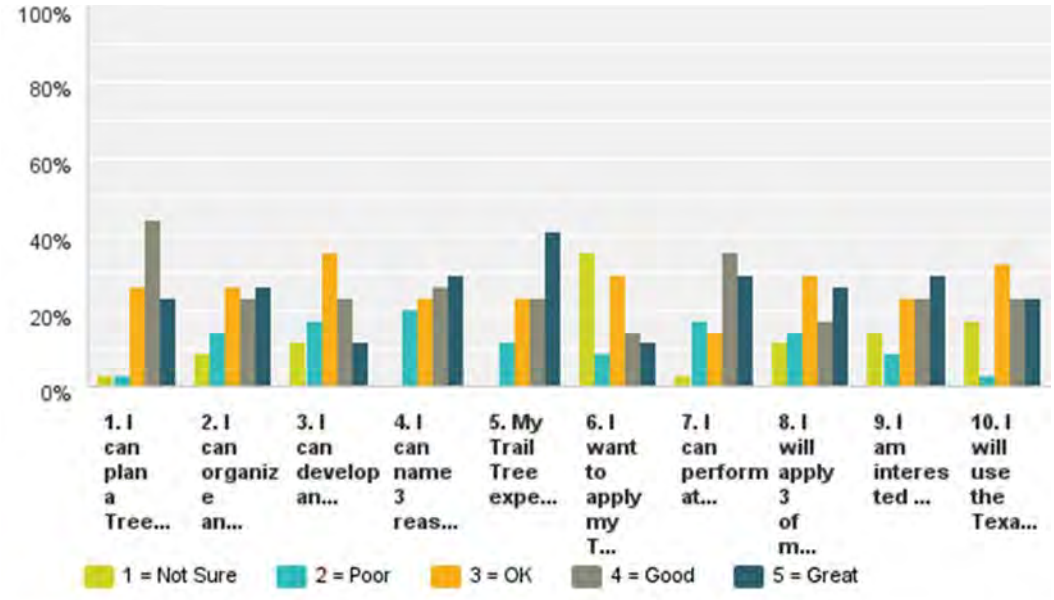
Again, the results of the pretests and posttests can reveal to teachers how their instruction has provided achievement toward the goal and objectives of the module. In Module Five, students appear to have gained in all but one statement of learning. Teachers use of the results will help them define need for extended instruction and need to praise student accomplishments. Due to the very small population of students who participated in this module, Module Five should be field tested with a larger population to substantiate any notable increase in learning.

MODULE TEN: STUDENT SERVICE LEADER
Pretest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can plan a Tree Trail service to perform for my school.	94.12% 32	2.94% 1	2.94% 1	0.00% 0	0.00% 0	34
2. I can organize and conduct a needs assessment.	73.53% 25	17.65% 6	0.00% 0	0.00% 0	8.82% 3	34
3. I can develop an evaluation form for a service project.	88.24% 30	5.88% 2	5.88% 2	0.00% 0	0.00% 0	34
4. I can name 3 reasons why Tree Trail student services are important.	67.65% 23	11.76% 4	14.71% 5	2.94% 1	2.94% 1	34
5. My Trail Tree experiences have boosted my knowledge of how important trees are to our world.	58.82% 20	14.71% 5	17.65% 6	5.88% 2	2.94% 1	34
6. I want to apply my Tree Trail learning to become a Service Leader for my school.	64.71% 22	17.65% 6	11.76% 4	5.88% 2	0.00% 0	34
7. I can perform at least 2 Tree Trail Services for my family.	50.00% 17	23.53% 8	20.59% 7	2.94% 1	2.94% 1	34
8. I will apply 3 of my Tree Trail learning experiences to preserve the health of our trees and forests.	64.71% 22	14.71% 5	8.82% 3	2.94% 1	8.82% 3	34
9. I am interested in learning more about ways I can be involved in forestry services.	32.35% 11	17.65% 6	14.71% 5	11.76% 4	23.53% 8	34
10. I will use the Texas A&M Forest Service website to provide leadership with services I can provide.	50.00% 17	26.47% 9	14.71% 5	8.82% 3	0.00% 0	34

Posttest results:



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. I can plan a Tree Trail service to perform for my school.	2.94% 1	2.94% 1	26.47% 9	44.12% 15	23.53% 8	34
2. I can organize and conduct a needs assessment.	8.82% 3	14.71% 5	26.47% 9	23.53% 8	26.47% 9	34
3. I can develop an evaluation form for a service project.	11.76% 4	17.65% 6	35.29% 12	23.53% 8	11.76% 4	34
4. I can name 3 reasons why Tree Trail student services are important.	0.00% 0	20.59% 7	23.53% 8	26.47% 9	29.41% 10	34
5. My Trail Tree experiences have boosted my knowledge of how important trees are to our world.	0.00% 0	11.76% 4	23.53% 8	23.53% 8	41.18% 14	34
6. I want to apply my Tree Trail learning to become a Service Leader for my school.	35.29% 12	8.82% 3	29.41% 10	14.71% 5	11.76% 4	34
7. I can perform at least 2 Tree Trail Services for my family.	2.94% 1	17.65% 6	14.71% 5	35.29% 12	29.41% 10	34
8. I will apply 3 of my Tree Trail learning experiences to preserve the health of our trees and forests.	11.76% 4	14.71% 5	29.41% 10	17.65% 6	26.47% 9	34
9. I am interested in learning more about ways I can be involved in forestry services.	14.71% 5	8.82% 3	23.53% 8	23.53% 8	29.41% 10	34
10. I will use the Texas A&M Forest Service website to provide leadership with services I can provide.	17.65% 6	2.94% 1	32.35% 11	23.53% 8	23.53% 8	34

Module Ten Pretest and Posttest Comparison

Percentage Increase (+) or Decrease (-) in combined percent of Good and Great to reflect learning of concepts and objectives.

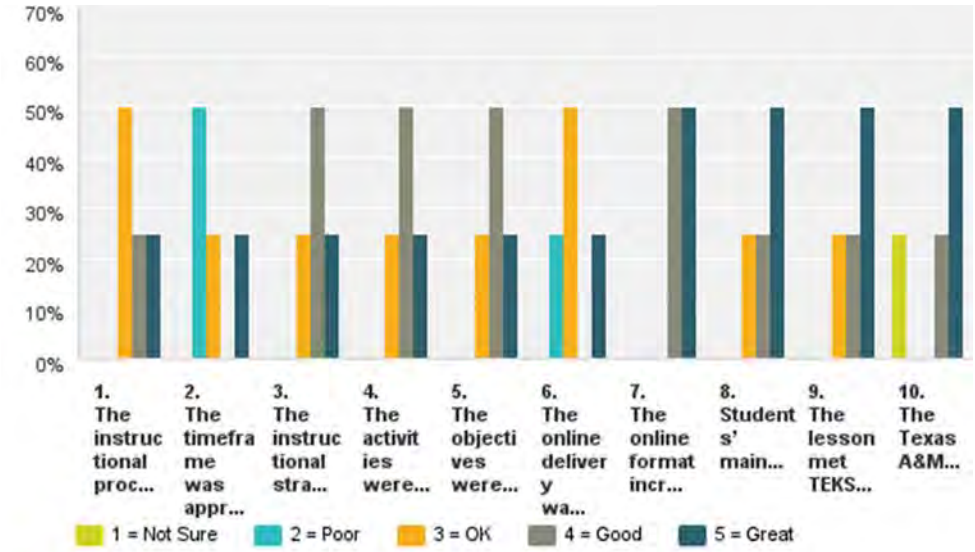
Statement	Pretests %	Posttests%	(+)Increase or (-) Decrease%
1. I can plan a Tree Trail service to perform for my school.	0.0	67.65	+67.65
2. I can organize and conduct a needs assessment.	8.82	50.	+41.18
3. I can develop an evaluation form for a service project.	0.0	35.29	+35.29
4. I can name 3 reasons why Tree Trail student services are important.	5.88	55.88	+50.
5. My Tree Trail experiences have boosted my knowledge of how important trees are to our world.	8.82	64.71	+55.89
6. I want to apply my Tree Trails learning to become a Service Leader for my school.	5.88	26.47	+20.59
7. I can perform at least 2 Tree Trails Services for my family.	5.88	64.7	+58.82
8. I will apply 3 of my Tree Trails learning experiences to preserve the health of our trees and forests.	11.76	44.12	+32.36
9. I am interested in learning more about ways I can be involved in forestry services.	35.29	52.94	+17.65
10. I will use the Texas A&M Forest Service website to provide leadership with services I can provide.	8.82	47.06	+38.24

Module Ten Comments:

While only a limited number of students received instruction on this cumulative module, the results of the pretests and posttests reflect achievement worthy of student and teacher acknowledgement for their completion the Tree Trails Project Goals. The results with this population demonstrate that their competition of prerequisite modules contributed to success in performance as student service leaders for the Tree Trails Project. The results need further validation with a larger population. However, for these students, their work tends to substantiate Tree Trails as an authentic, reliable program for implementation in classrooms across the state. Again, because of the limited time and the number of students involved in field testing this module should be fielded tested with a larger population over an extended period.

TEACHER SURVEYS

MODULE ONE: MAP A TREE TRAIL



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. The instructional procedures were clear.	0.00% 0	0.00% 0	50.00% 2	25.00% 1	25.00% 1	4
2. The timeframe was appropriate.	0.00% 0	50.00% 2	25.00% 1	0.00% 0	25.00% 1	4
3. The instructional strategies enhanced instruction.	0.00% 0	0.00% 0	25.00% 1	50.00% 2	25.00% 1	4
4. The activities were age appropriate.	0.00% 0	0.00% 0	25.00% 1	50.00% 2	25.00% 1	4
5. The objectives were measurable.	0.00% 0	0.00% 0	25.00% 1	50.00% 2	25.00% 1	4
6. The online delivery was easy to follow.	0.00% 0	25.00% 1	50.00% 2	0.00% 0	25.00% 1	4
7. The online format increased student interest.	0.00% 0	0.00% 0	0.00% 0	50.00% 2	50.00% 2	4
8. Students' maintained interest in the lesson.	0.00% 0	0.00% 0	25.00% 1	25.00% 1	50.00% 2	4
9. The lesson met TEKS/STAAR measures.	0.00% 0	0.00% 0	25.00% 1	25.00% 1	50.00% 2	4
10. The Texas A&M Forest Service is a valuable educational resource.	25.00% 1	0.00% 0	0.00% 0	25.00% 1	50.00% 2	4

Statements	% Agreement with good & great
1. The instructional procedures were clear.	+ 50
2. The time frame was appropriate.	+25
3. The instructional strategies enhanced student learning.	+75
4. The activities were age appropriate.	+75
5. The objectives were measureable.	+75
6. The online delivery was easy to follow.	+25
7. The online format increased student interest.	+100
8. Students maintained interest in the lesson.	+75
9. The lesson met TEKS/STAAR measures.	+75
10. The Texas A&M Forest Service is a valuable educational resource.	+75

Comments:
Four teachers of seven responded. These teachers agreed with the online format creating student interest and all other statements. Teachers agreed less that the timeframe was appropriate and the online delivery was easy to follow indicating a need to revise the timeframe and the online delivery.

Other teacher responses:
Student Interest:
Fifth-grade:

- Showed students the Map My Property feature on the Tree Trails website and the Google map of our school oohs — and ahhs from the students.
- Truly enjoyed.
- Student interest was high.

Eighth-grade:

- Module One was exciting to my eighth-graders — they love going outside and took pride in choosing their tree.

Curriculum and Time:
Fifth-grade:

- I feel like they have used a lot of time to just do the pretests and posttests thus far.
- Have pretests and posttests on hard copies.
- Provide lesson modules on a CD or have access via web to make copying easier.

Eighth-grade:

- I first want to applaud you for designing a well-written and thorough curriculum to teach students about our natural world.

Website and Technology:

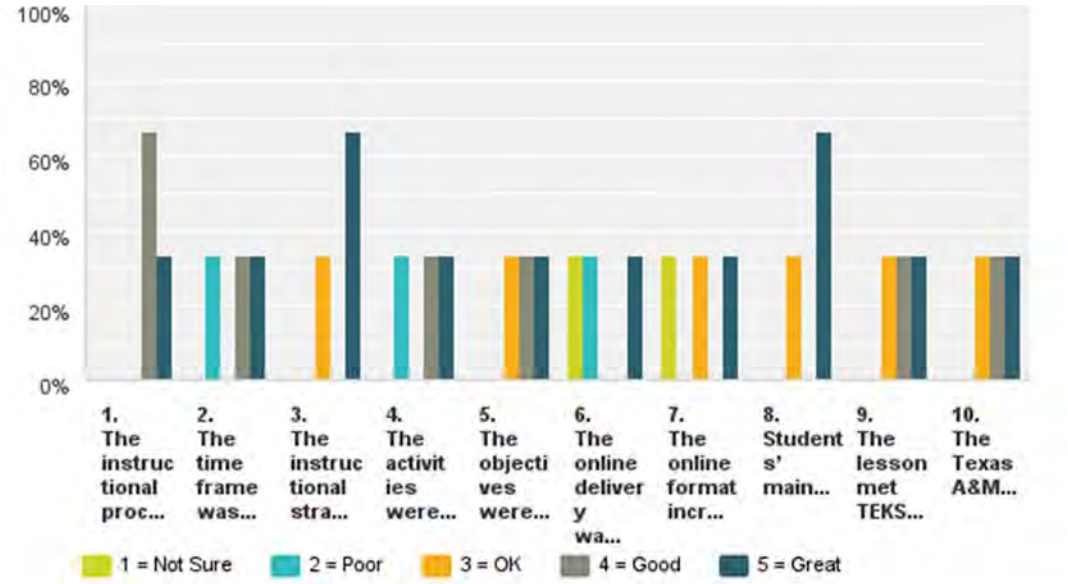
Fifth-grade:

- Tried to plot trees on the website with the class, but had some difficulties so ended up doing it after class. We have difficulty with computers—not enough for everyone
- We could not get our trail named, and had a tricky time saving data
- We had a difficult time making our trail on the website. I am still not sure if it is correct.
- It was difficult to utilize the tech portion of this project since I have only three student computers.

Eighth-grade:

- Accessing the computer lab turned out to be an issue for me. Of course many schools now operate 1:1, but I would want other schools that are catching up to be able to use this valuable tool also.
- We entered our tree trail on our one classroom laptop as a group, but then when the next class added their information I noticed the first one was gone. I think this was an error on our part, but the information seems to be able to be deleted easily. We are working on this again, but maybe a comment on the security or saving would help. This might be there and I didn't see it.

MODULE TWO: TREE IDENTIFICATION



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. The instructional procedures were clear.	0.00% 0	0.00% 0	0.00% 0	66.67% 2	33.33% 1	3
2. The time frame was appropriate.	0.00% 0	33.33% 1	0.00% 0	33.33% 1	33.33% 1	3
3. The instructional strategies enhanced student learning.	0.00% 0	0.00% 0	33.33% 1	0.00% 0	66.67% 2	3
4. The activities were age appropriate.	0.00% 0	33.33% 1	0.00% 0	33.33% 1	33.33% 1	3
5. The objectives were measurable.	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
6. The online delivery was easy to follow.	33.33% 1	33.33% 1	0.00% 0	0.00% 0	33.33% 1	3
7. The online format increased student interest.	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
8. Students' maintained interest in the lesson.	0.00% 0	0.00% 0	33.33% 1	0.00% 0	66.67% 2	3
9. The lesson met TEKS/STAAR measures.	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
10. The Texas A&M Forest Service is a valuable educational resource.	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3

Statements	% Agreement with good & great
1. The instructional procedures were clear.	+100
2. The time frame was appropriate.	+67
3. The instructional strategies enhanced student learning.	+67
4. The activities were age appropriate.	+67
5. The objectives were measureable.	+67
6. The online delivery was easy to follow.	+33.33
7. The online format increased student interest.	+33.33
8. Students maintained interest in the lesson.	+67
9. The lesson met TEKS/STAAR measures.	+67
10. The Texas A&M Forest Service is a valuable educational resource.	+67

Comments:
Three of seven teachers completed this evaluation. These teachers agreed 100% that the instructional procedures were clear. One teacher agreed that the online format was easy to follow. These teachers' opinions indicate a need to revise the online format.

Other teacher responses:
Student Interest:
Fifth-grade:

- Truly enjoyed.

Eighth-grade:

- Very good leaf identification sheet and vocabulary.

Curriculum and Time:
Fifth-grade:

- I think adding an activity either using leaves collected from trees (especially ones from species that can be identified using the website) other than the ones from their trails or pictures/scans and just have them practice identifying different trees and navigate the website would be good prior to them doing their own tree—even just giving each group the same leaf and model it using their input?
- I had to do two days of observation (inside and outside) as simple and compound leaves were not understood well so showing some specimens or pictures ahead of time would have been good.
- Explanation great on the use of dichotomy key, This is a seventh-grade TEK and a great experience for fifth-grade.

Eighth-grade:

- Extend/Elaborate: Remind students to take leaves from the ground.
- Maybe when students write their poem, they could go outside and sit by a tree.

Website and Technology:

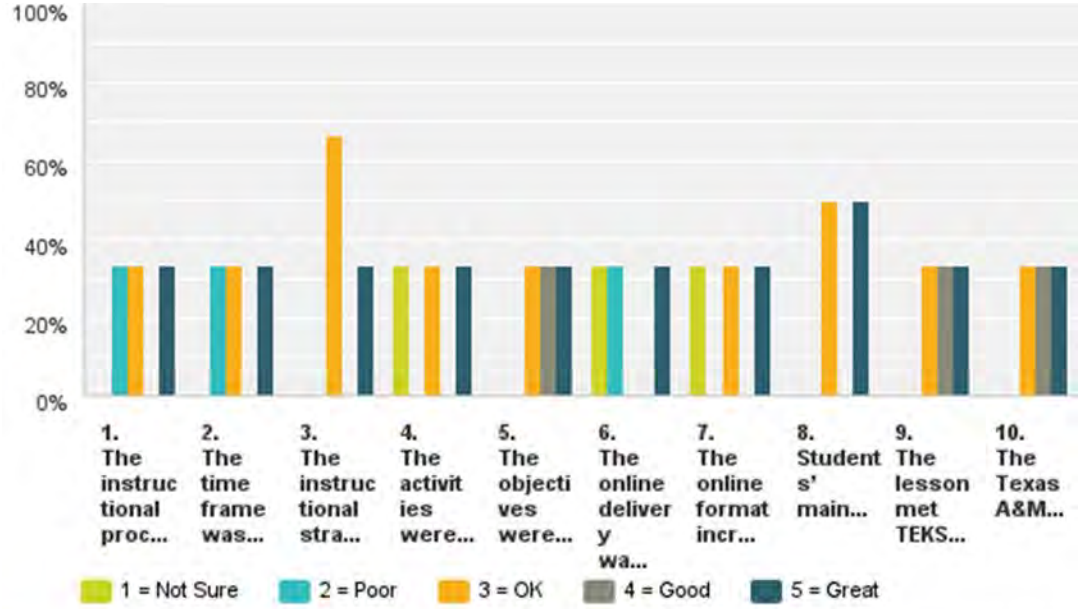
Fifth-grade:

- Have pretests and posttests on hard copies.

Eighth-grade:

- With computer labs and limited access, teachers will need to improvise for computer applications that are in the curriculum.

MODULE THREE: TREE MEASUREMENT



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. The instructional procedures were clear.	0.00% 0	33.33% 1	33.33% 1	0.00% 0	33.33% 1	3
2. The time frame was appropriate.	0.00% 0	33.33% 1	33.33% 1	0.00% 0	33.33% 1	3
3. The instructional strategies enhanced student learning.	0.00% 0	0.00% 0	66.67% 2	0.00% 0	33.33% 1	3
4. The activities were age appropriate.	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
5. The objectives were measurable.	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
6. The online delivery was easy to follow.	33.33% 1	33.33% 1	0.00% 0	0.00% 0	33.33% 1	3
7. The online format increased student interest.	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
8. Students' maintained interest in the lesson.	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
9. The lesson met TEKS/STAAR measures.	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3
10. The Texas A&M Forest Service is a valuable educational resource.	0.00% 0	0.00% 0	33.33% 1	33.33% 1	33.33% 1	3

Statements	% Agreement with good & great
1. The instructional procedures were clear.	+33
2. The time frame was appropriate.	+33
3. The instructional strategies enhanced student learning.	+33
4. The activities were age appropriate.	+33
5. The objectives were measureable.	+67
6. The online delivery was easy to follow.	+33
7. The online format increased student interest.	+33
8. Students maintained interest in the lesson.	+50
9. The lesson met TEKS/STAAR measures.	+67
10. The Texas A&M Forest Service is a valuable educational resource.	+67

Comments:
Out of seven teachers, three responded to all statements and one responded to all but one statement. Their responses indicate that closer review of this module may be needed to determine appropriate revisions. The module appears to contain measurable objectives that match Texas Education Association standards.

Other teacher responses:
Student Interests:
Fifth-grade:

- Very Interesting.

Eighth-grade:

- Under Height on the Tree Measurement Guidelines, we used the pencil method as we didn't have any of the other tools and most schools will not have them. The drawings were very useful and easy to use.

Curriculum and Time:
Fifth-grade:

- Using the really long tape measure that converts to feet was great, especially for special needs students.
- It was very difficult to monitor all five of my groups so this activity definitely calls for more adult assistance—perhaps next year I will see if any parents would like to come and assist.
- I had limited time this year and it was hard to schedule ahead of time given weather conditions.
- There were no units to be measured in on the data sheet so I just assumed inches for circumference and diameter, and then feet for crown spread and tree height.
- Fifth-grade is a state tested grade and teachers have little room for error. Since students have used standard measurements up to this point and fifth-grade is

responsible for metric, our fifth-grade teachers strongly disagree with anything that doesn't use metric, as that is what their kids will be tested on in April.

Eighth-grade:

- On the page of "Tree Measurement Guidelines" under Getting Started the statement is made, "All recorded measurements should be rounded down to the nearest whole number"—my eighth-graders didn't get this.
- Unless you include a statement about that is how [foresters] determine their measurements—teachers will not understand and certainly will not let their students do this.
- The crown spread instructions were a little more difficult to follow. I am not sure a fifth-grader would be able to use this example.
- The concept of perpendicular is one that fifth-grade students need and often struggle with during the year.

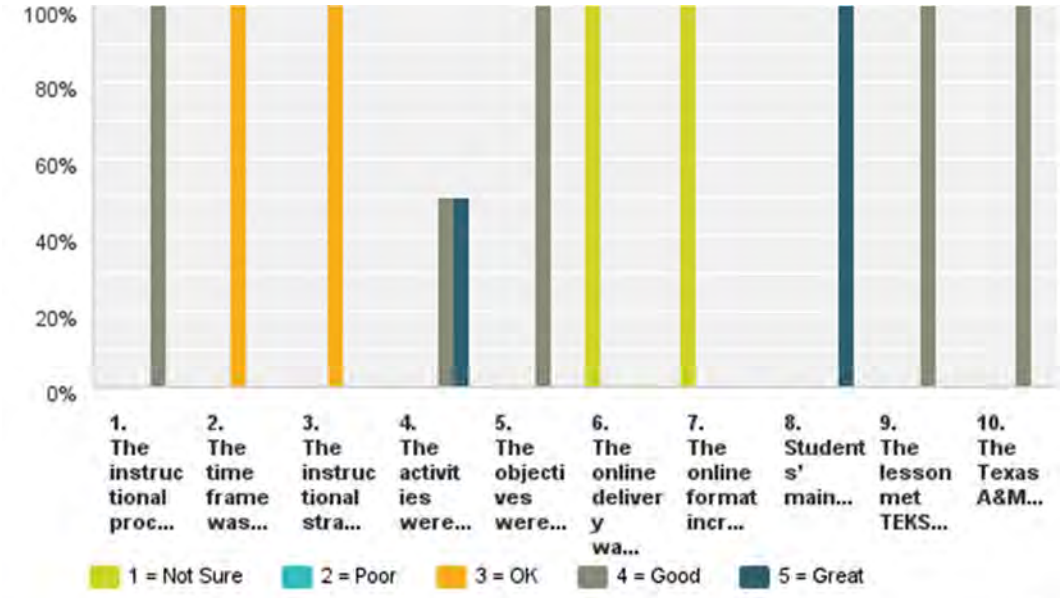
Website and Technology:

Fifth-grade:

- I ended up inputting some of the data as we were having difficulty with the website when the students were trying to do it the day we had computer lab—at least they tried. This was a little frustrating as it wasn't taking some of their measurements and would not save it—also, some of our trees disappeared for my second period.

Eighth-grade: no comment.

MODULE FOUR: TREE FUNCTION AND STRUCTURE



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. The instructional procedures were clear.	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
2. The time frame was appropriate.	0.00% 0	0.00% 0	100.00% 2	0.00% 0	0.00% 0	2
3. The instructional strategies enhanced student learning.	0.00% 0	0.00% 0	100.00% 2	0.00% 0	0.00% 0	2
4. The activities were age appropriate.	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
5. The objectives were measurable.	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
6. The online delivery was easy to follow.	100.00% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	2
7. The online format increased student interest.	100.00% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	2
8. Students' maintained interest in the lesson.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	2
9. The lesson met TEKS/STAAR measures.	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
10. The Texas A&M Forest Service is a valuable educational resource.	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2

Statements	% Agreement with good & great
1. The instructional procedures were clear.	+100
2. The time frame was appropriate.	0
3. The instructional strategies enhanced student learning.	0
4. The activities were age appropriate.	+100
5. The objectives were measureable.	+100
6. The online delivery was easy to follow.	0
7. The online format increased student interest.	0
8. Students maintained interest in the lesson.	+100
9. The lesson met TEKS/STAAR measures.	+100
10. The Texas A&M Forest Service is a valuable educational resource.	+100

Comments:
Two of the seven teachers responded to this evaluation. They agreed with six of the 10 statements. They did not agree with four statements regarding the time frame, strategies to enhance student learning, online delivery and online format. These evaluations indicate that some revisions may be in order in the areas of concern.

Other teacher responses:
Student Interest:
Fifth-grade:

- Instead of a skit, I assigned each group to create a game that taught/tested the vocabulary of the structure and function of trees—they are "LOVING" this. Each group will play the others games and then rate them. I figure while they are creating the game they are learning the vocabulary, and then should be able to appropriately play and critique others—also many were familiar with this venue as we play a lot of science and math games to reinforce concepts—ELA teachers may prefer the skit, but as a math/science teacher I prefer the analysis and planning involved in game making—plus I didn't assign a specific type of game so some are doing board games, some memory or card sorts, matching, etc.

Eighth-grade:

- Students love activities with "tree cookies."

Curriculum and Time:
Fifth-grade:

- I used the *History of a Tree* and *How Old Was this Tree?* activity pages from AIMS Budding Botanist for the tree cookie activity. There was no explanation on the website or in the manual for the pictured tree cookies so we just discussed what could have been possible explanations for some of the scarring on the pictured tree cookies—

however, the AIMS note pages has a brief explanation about scars and how to interpret the width of rings.

- I allowed additional time spent on the measuring so that each student could have a turn doing each one—and then each group having a lot of data to compare their measurements and reasonableness. Also, since both of my classes have the same trees in their trail it makes for good comparison on accuracy of measurement—also reinforces repeated trials=more date=more valid results.
- Setting up measurement criteria ahead of time—inches, feet, etc. and then allowing for practice for long distances—not as easy as you would think for fifth-graders to use a couple of meter sticks without having some difficulty working together.
  Also, it was very difficult for them to do the tree height so we really made sure they had plenty of data on that measurement to qualify their result—meaning multiple days and attempts.

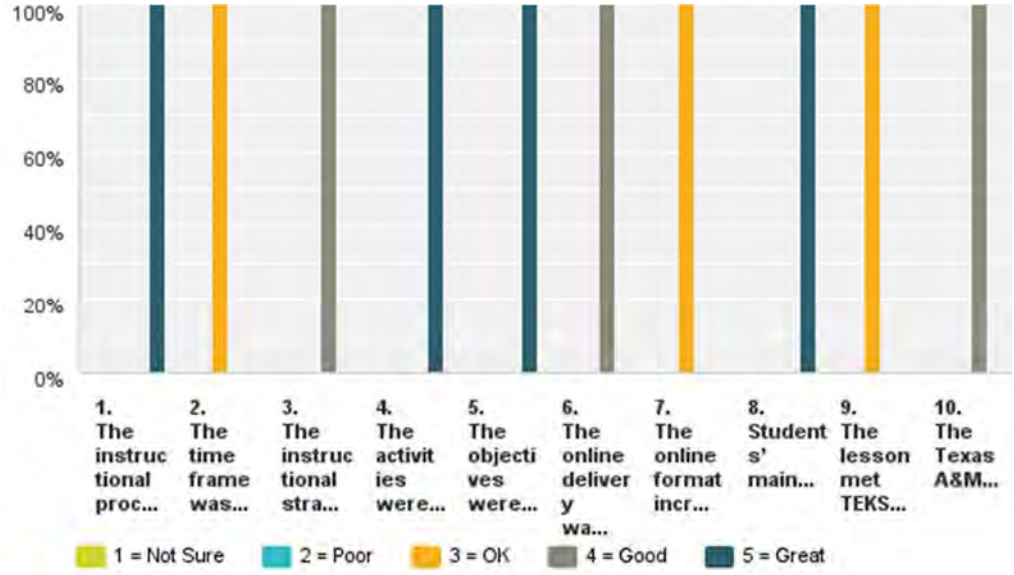
Eighth-grade:

- Students came up with taping straws to the xylem to represent "sucking up of water and nutrients" and understood and remembered it.
- Reword no. 2 to read: "During photosynthesis, leaves use solar energy from the sun to transform carbon dioxide from the atmosphere and water from the soil into sugar and oxygen producing a chemical change."

Website and Technology:

Fifth-grade and Eighth-grade: no comments.

MODULE FIVE: BENEFITS AND VALUES OF TREES



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. The instructional procedures were clear.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
2. The time frame was appropriate.	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
3. The instructional strategies enhanced student learning.	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1
4. The activities were age appropriate.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
5. The objectives were measurable.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
6. The online delivery was easy to follow.	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1
7. The online format increased student interest.	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
8. Students' maintained interest in the lesson.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
9. The lesson met TEKS/STAAR measures.	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
10. The Texas A&M Forest Service is a valuable educational resource.	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1

Statements	Agreement % with good & great
1. The instructional procedures were clear.	100
2. The timeframe was appropriate.	0
3. The instructional strategies enhanced student learning.	100
4. The activities were age appropriate.	100
5. The objectives were measureable.	100
6. The online delivery was easy to follow.	100
7. The online format increased student interest.	0
8. Students maintained interest in the lesson.	100
9. The lesson met TEKS/STAAR measures.	0
10. The Texas A&M Forest Service is a valuable educational resource.	100

Comments:
One teacher responded to the Module Five evaluation. She agreed 100 percent with seven statements. She did not agree that the timeframe was appropriate, that the online format increased student interest or that the module met TEA standards. It may be worthy to review and/or revise as needed.

Other teacher responses:
Student Interests:
Fifth-grade:

- This was our favorite module.

Eighth-grade:

- My eighth-graders … love scavenger hunts so this activity will be fun for all. This is a great activity to introduce the benefits and importance of trees.

Curriculum and Time:
Fifth-grade:

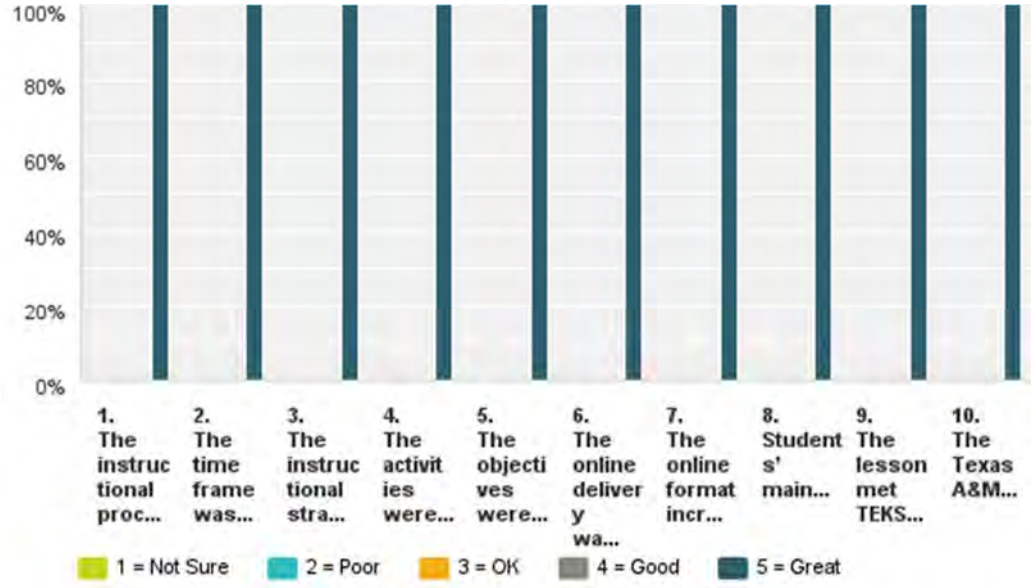
- Pull up some different trees from different tree trails and champion trees and compare our trees to those and analyze the differences in information—have the students formulate suggestions for improving our benefit/value for our area/school.

Eighth-grade:

- It would be great if the teacher collected the actual items and had them available to show as she explains after the scavenger hunt what part is responsible for each item.
- Under Explain continued … wildlife habitat … include a statement that even a fallen limb or rotting log has some benefit to wildlife.

Website and Technology:
Fifth-grade and Eighth-grade: no comments.

MODULE TEN: STUDENT SERVICE LEADER



	1 = Not Sure	2 = Poor	3 = OK	4 = Good	5 = Great	Total
1. The instructional procedures were clear.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
2. The time frame was appropriate.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
3. The instructional strategies enhanced student learning.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
4. The activities were age appropriate.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
5. The objectives were measurable.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
6. The online delivery was easy to follow.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
7. The online format increased student interest.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
8. Students' maintained interest in the lesson.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
9. The lesson met TEKS/STAAR measures.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1
10. The Texas A&M Forest Service is a valuable educational resource.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1

Statements	Agreement % with good & great
11. The instructional procedures were clear.	100
12. The timeframe was appropriate.	100
13. The instructional strategies enhanced student learning.	100
14. The activities were age appropriate.	100
15. The objectives were measureable.	100
16. The online delivery was easy to follow.	100
17. The online format increased student interest.	100
18. Students maintained interest in the lesson.	100
19. The lesson met TEKS/STAAR measures.	100
20. The Texas A&M Forest Service is a valuable educational resource.	100

Comments:
One teacher returned their evaluation of Module Ten. She agreed 100 percent with all statements.

Other teacher responses:
Student Interests:
Fifth-grade:

- Students seemed interested in helping the environment.

Eighth-grade:

- I love the Arbor Day celebration ideas as this is often overlooked. My kids liked charades although we didn't have time to really develop this activity.

Curriculum and Time:
Fifth-grade:

- Fifth-graders would really like it with some explanations before the game such as: financial, ancient, pruning.

Eighth-grade:

- My eighth-graders used the Explore idea of informing others of the virtues of trees and the benefits and values we receive from them. They created short videos and I will send them to you. Keep in mind they had limited time to do these, but with scheduled time I can see where this would be fantastic!

Website and Technology:
Fifth-grade and Eighth-grade: no comments.

IV. SUMMATIVE EVALUATIONS AND RESULTS

Summative evaluations are measures of student progress and achievement at the end of a project/program. These may be used to provide feedback of the entire learning process, suggest needed adjustments for overall program and/or for specific activities. These summations provide input for decision making to revise, modify and make adjustments as needed. The student summative evaluations (Appendix F) and the teacher summative evaluations (Appendix G) were the major instruments used in this report. These are both qualitative (objective-based) and quantitate (subjective oriented).

Student Evaluations
Student summative evaluations were administered by teachers during May 2014. Five fifth-grade teachers returned a total of 210 student evaluations.

The purposes of the Student Summative Evaluation were to

- Determine the level of student centered activities
- Determine authenticity of activities and age appropriateness
- Assess effectiveness of the learning activities toward improving student achievement of the overall program goals and objectives
- Assess the efficiency and effectiveness of software designed for student learning activities

The Student Summative Evaluation Form asks four questions intended to measure the above criteria. The questions and student responses follow:

1. What Tree Trail activities did students like the
    a. Most:
        - Creating a Tree Trail; using Tree Trails to make my trail part of the site; taking part in the whole Tree Trail study, making up our Tree Trail name; locating a tree, picking tree; learning about trees at my school
        - Measuring the tree and using different tools; finding out about the shapes, learning how to take a leaf sample safely; learning the different conditions of trees; putting leaves in my science journal; looking a new types of trees
        - Doing the research and learning more about trees; getting outside and studying my tree; learning how people can harm trees (lawnmowers) and that we can stop that from happening
        - Having Matt Weaver come talk to our school; the way our teacher did the lessons
        - Tree detective work; scavenger hunt; making a game; taking the surveys was fun; tree cookies were very good.

b. Least:
   - Rushed due to time; ran out of time
   - Days we missed and didn't get to do Tree Trails and it rained
   - Website sometimes hard to use; computer glitches — we could never put the name of our trail in the computer; we had to share three computers with our whole class and it took a long time to put data in for the modules, sharing four computers made it hard to get data in; not enough computers; remembering how to use the site
   - Presenting my data; identifying my tree; locating tree, taking measurements; we had a cedar elm and it was hard to find on the website
   - When taking the survey we kept having to log off and log back on when sharing computers so it didn't work as easy as we hoped; difficulty with surveys

2. What type of learning did they like (number of students responding and percent of that number):
   - Computer: 99, 45 percent
   - Recording personal activities such as Learning Logs: 74, 35 percent
   - Outdoor experiences: 174, 83 percent
   - Group Work: 110, 52 percent
   - Creating projects: 151, 72 percent
   - Other:

3. If students were in charge of Tree Trails, would there be anything they would do to make it better for students:
   - Make the site easier to use for kids; fix all the glitches on the computer; work the glitches out of the website to make it easier for students to share and it doesn't take so long; the sites are hard to navigate; more technology; make an app; have a glossary on the website to explain definitions in kid format
   - Add video on how to measure the different parts of a tree; make a virtual tree to practice with; advanced tree identification; easier way to measure
   - Learn more about research before we start; make less complicated; easier research in the beginning; more explanation as to why they were doing the different activities; compare and contrast two trees instead of learning about one.
   - Have interactive learning games, games on the website; add some forest games online; and make a tree joke section on the website "What does a tree sleep on when it goes camping? (an apricot)"
   - a visit from someone within forestry to explain job; real forest field trip; let kids grow trees and take care of them; plant trees of various types.

- A picnic under our tree

4. Is there anything else they like to tell us about their Tree Trail experience?
    - It was fun; we enjoy the outdoors; we liked working outside; I liked outside project; I really liked the outdoor aspect of it.
    - I didn't expect it to be so much fun; I had fun doing this; I loved every aspect of it and I want to do this again; it was different, we did not do anything like this last year; we go to learn something new every day; I want to come back from high school and see my tree; it was exciting to learn about trees in our area; I didn't know there was so much to learn about trees; I got to see a new side of trees; there is so much to learn about trees; learned to better cooperate with others with group activities
    - We wanted to do more but ran out of time; we liked having flash drives; thank you; we know how to work the website; it was fun learning how to do things on the computer; ID the tree; make the trail; I liked using the Tree Trails website
    - I learned what a Tree Trail is; I know a lot about Texas Trees; I know about researching trees; I now know how to measure a tree; improved ability to measure the height of a tree; I liked looking at the tree cookie to see if they had fire damage, grew on a slope, had infestations, etc.; we know about the personality or traits of a tree; we know how humans can affect trees negatively and positively how to take care of trees now and keep them in good condition; it was exciting knowing how much damage a tree can take from nature and still be standing tall
    - I liked when Matt Weaver came out and told us how lawn mowers are cutting into our trees damaging them. I wrote a letter persuading them to stop.

Reflections on Student Summative Evaluations:
The results provide an important guide to determine ways to make Tree Trails easier for teachers and students to use. This information shows the strengths and weakness of the Project, suggests revisions, modifications and clarifications that should receive attention to improve the program for all teachers and students.

Student responses validate the effectiveness of Tree Trails for achieving its goals and objectives for the population responding. Other notable conclusions are:

a. Students enjoyed Tree Trails learning activities, especially their outdoor experiences.
b. Students experienced problems with the software program.
d. Student met the learning goals and objectives using higher level thinking skills as embedded in the instructional activities.
e. Students needed more time to complete the modules and take the pretests and posttests.
f. Students needed more computers to complete the activities in a timely manner.

g. Modules may be modified to address classrooms with limited computer access.
e. Learning was authentic, applicable and age appropriate.

Teacher Evaluations

Teacher summative evaluations were provided for teachers during May 2014. Five fifth-grade teachers and one eighth-grade teacher submitted their evaluations and/or responses about Tree Trails.

The purposes of the Teacher Summative Evaluation were to determine the

- Effectiveness and efficiency of instructional format to achieve the goals and objectives of the overall project
- Usability of the curriculum modules
- Cost effectiveness of the project
- Efficiency and effectiveness of software for use of the curriculum and the technology application
- Scalability of Tree Trails

The Teacher Summative Evaluation Form asks seven questions intended to measure the above criteria. The questions and teacher responses follow:

1. Are there any experiences or thoughts about the use of the Tree Trails Project you would like to share with us?
    - I am looking forward to having the entire year to fully implement the program next year.
    - My students loved being outdoors. They enjoyed learning about their tree and how it benefits their environment.
    - My students needed some background on what the Forest Service is all about. I also spent some time front loading the Tree Trails lesson with some mapping lessons and some practice on how to look at an area from a bird's eye view.
    - My students enjoyed Tree Trails and the opportunity to go outside and make learning come to life. We had the opportunity to have Matt Weaver come speak to us which really made an impact on the students. Not only did they learn information, but they met someone who actually works with trees as a career. It was powerful.
    - I think the use of the Tree Trails Project is a fun way to educate our students about the natural world. Our 21st century learners need this type of curriculum to balance their technology skills and help them to understand concepts of our natural world that is not necessarily taught in the classroom.

2. What would you consider the consequences of the Tree Trails Project on

   Students:

   Awareness; awareness of trees and their positive impact on the environment; none; definitely my students are more mindful and aware of trees and how vital they are to our world. They now come to school talking about trees at their houses, warning families and lawn services about not getting too close and most of all, respecting nature; a new appreciation of trees and nature, ownership of our planet and good stewardship; really enjoyed more focused game, understanding the vocabulary

   Parents:

   Student awareness; hopefully the students will pass along their recently gained insight into the importance of trees; none; as students share information with families, hopefully parents will become educated as well; involvement would also (educate) parents to the importance of trees and nature; not sure of conversation

   Community:

   It is a domino effect, once families are educated, neighborhoods will hopefully start to plant trees, respect the trees they have and be bold enough to make a difference when needed; not enough time; makes the students more aware of the benefits of trees; the students' awareness of trees will hopefully benefit the communities trees; none; community involvement could evolve into planned parks and a new appreciation for the natural world

3. a. Would you recommend any additions to the Tree Trails Project that could assist it to "stand alone" online (without teacher training)?
   - I think the manual is clear, concise and easy to follow without teacher training.
   - The site links were difficult to find and students had a hard time navigating the sites.
   - I honestly feel that in order for this program to truly be a success, the teachers need initial training. Just as our students, we learn better if we can get outside and try it ourselves.
   - An option may be to include videos teaching and modeling each module for teachers to see it in action (such as a video showing how to measure the different parts of a tree).

   b. Would you recommend any additions to the Tree Trails Project that would assist teachers with minimal contact training to use online program?
   - Enjoyed the help and thought it was very beneficial.
   - An overview page of the project and how to implement. Which modules are best if you have a limited time. Let teachers know that it is possible to do these modules a few at a time or in another sequence.

- Definitely including videos showing demonstrations of how each module should be taught.
- An expert that would be willing to field questions through email. Teachers often need a resource to go to for those odd questions or experiences that they will encounter.

4. What do you consider the challenges to implement Tree Trails Project instruction with
   a. Fifth-grade students statewide?
      - The major impediment for us is the total focus on the standardized test. We have been directed to not cover any material that is not in the test. That said, we have every intention of fully implementing the program in 2014 – 2015 from the beginning of the year as part of our science investigations; With STAAR testing, it is difficult to go as deep in the lessons and still cover the rest of our required curriculum. The lack of computers in the classroom make it difficult to complete the modules in a timely manner (If you have assigned computer times, you have to wait until then to do them. Or what we did was complete them on paper and then input the data for pretests and posttests; access to technology; already have a full curriculum to teach; really no challenges except availability of number of computers

   b. Third-grade and eighth-grade:
      - Access to adequate technology; fitting the lessons into an already packed curriculum; really no challenges except availability of number of computers.

5. List three things (or more, if appropriate) that were most helpful in implementing Tree Trails.
   - Concise objectives per module; clearly written manual; lesson modules were very well written; curriculum; the lessons were laid out well; teacher tips were very useful; love the 5E model of instruction; pre/posttests; multidisciplinary
   - Online map; supplies; student flash drives to hold data collection
   - I found the training a great starting point to prepare me; knowing if I had questions, Leslie was always available to help. She responded to my emails promptly; facilitator support; personal help; meeting with Frances to showcase the curriculum

6. List three things (or more, if appropriate) that were least helpful in implementing Tree Trails.
   - Difficulty with online surveys
   - Lack of computers; lack of student access to computers made taking the surveys hard

- We mapped our trees, input the data for each of our six trees, but couldn't get our name on our map; learning curve with online mapping
- Time constraint, but should not be a problem in the future; lessons were a bit longer in length than I anticipated; late start
- I would have liked more training and practice; I came on this program later than most teachers so they may have had a one-day workshop. Even a half-day to hit the highlights and demonstrate measuring techniques would be very useful.

7. Other comments, suggestions, recommendations
    - We loved the program and would like to use in the future.
    - I liked my students comment about picnic under their tree.
    - You will see the students made a booklet about their tree and I will be improving it for next year.
    - Next year, each student will have access to a tablet computer. I'd like to try this again when that happens.
    - Now that I have my feet wet with this project, I'll be able to implement more, faster…
    - I love the program and would like to see it incorporated into all grade levels. Our students need this instruction about the natural world. The 5E model and teacher tips were great.
    - Our problem we had was with the online surveys
    - Eighth-grade teacher comments: My concern, and I will be very candid here, is that with the amount of material the fifth-grade teachers must cover before the state testing, I don't think the program will be implemented in its desired form. I am telling you this as a teacher that understands the amount of material and the high-stakes that are involved in the state test scores. I can see this being used in parts of fifth-grade if you have a very energetic teacher that shares the same beliefs as I do. I think it would be a great elective course for elementary students and you certainly have enough material for the year. In addition, I thought about a couple modules being taught in first-grade and then on through the grades until you finish in fifth-grade. I know this would mean re-writing a lot of material, but just giving my thoughts. To be honest I would like to go through the other modules and give you feedback as I see this as a very worthy project. Let me say again I love the project and think you have addressed a much needed curriculum for our students.

Reflections on Teacher Summative Evaluations:

1. The effectiveness and efficiency of instructional format to achieve the overall goals and objectives of the project
   Many teachers thought the project was worthy of full implementation this coming school year. Teachers indicated that the students, families and the community benefited from the Tree Trails learning activities. The modules were concise, well written and teachers loved the 5E format. However, time constraints limited the number of modules the teachers were able to complete.

2. The usability of Tree Trails
   The lessons were laid out well, teacher tips were very useful and teachers found the multidisciplinary lessons to be useful in implementing the state standards.

3. The cost effectiveness of the project
   Teachers welcomed the free materials provided during training. Teachers new to the project may find the cost of the tape measure, jump drives and/or the tree cookies a concern. Teachers welcomed the free training and felt the training must continue to make the project work. Schools with limited computers will need to consider purchasing or developing a plan to share the computers in a manner feasible to implement Tree Trails.

4. The efficiency and effectiveness of software for use of the curriculum and the technology application
   The software program and online student pretests and posttests presented the biggest problems for teachers and students. They recommended specific changes which should be considered if all teachers and students are to use Tree Trails as intended.

5. The scalability of Tree Trails
   As indicated many of the teachers plan to fully implement Tree Trails this year, indicating the program may be replicated. Scalability of any program is important if it is to have impact on a large population. With the few recommended changes, this project could easily be implemented across Texas and perhaps the nation. In addition, some teachers felt Tree Trails could be implemented in grades three and eight with few changes. A testimony that Tree Trails is scalable.

VI. CONCLUSIONS

Successes:

The goal of Tree Trails — to create learning forests in schools — was achieved in the selected classrooms. Tree Trails served schools with an online program that is time efficient, cost effective, supported by scientific research, and aligned with the Texas Education Association's state standards. The Tree Trails objectives were achieved.

1. Get kids outside to learn about forests and trees and their uses, values and benefits.
2. Provide 10 instructional modules that educate students on trees and forests and national and regional priority issues including tree function, measurement, benefits, diversity, ecosystem, forest health, fire, tree history, urban forestry and forest service learning.
3. Provide modules that have a research-based instructional approach which integrates language arts, math, science and technology and state testing measures with outdoor learning activities to create real and virtual arboretums at schools.
4. Combine classroom digital media and internet technology with outdoor learning opportunities and enable classrooms to effectively engage in learning about trees and forests with each other.
5. Provide evaluation tools for assessing and creating a reliable, viable and sustainable Tree Trails curriculum for teachers and students.

Additionally, students' formative and summative evaluations indicate how much they enjoyed their Tree Trails experiences and how much knowledge they gained about trees, and caring for and enhancing their environment. Higher level learning engagement is evidenced by application of Bloom's Taxonomy in the student end products and within the learning activities. Examples of engagement are research and investigation of learning as in "tree detectives," analysis of tree conditions and evaluation of their tree cookies. Students' successes show a positive overall final evaluation of Tree Trails and complete the purposes of the Tree Trails Project Field Test.

Comments:

1. Student attendance information was not provided by the teachers but may be implied through students' attendance while completing the pretests, posttests, and summative evaluations.

2. Standardized and state testing information were not collected as these tests were administered prior to implementation of Tree Trails. As a result academic achievement measures were not related to implementation of Tree Trails.

3. Alignment with state standards in language arts, mathematics, science and social studies was confirmed by teachers' module evaluations and their summative evaluations.

4. It is difficult to add to and/or surmise the students and teachers comments. However, a few statements stand out.
    a. First, in regards to the time limitations, teachers were only able to complete a minimum number of modules. We do not have any information related to what students and teachers could have provided us if they had the time to implement Modules Six, Seven, Eight and Nine. We may anticipate a positive reaction (as two teachers provided by reviewing these modules) but it is important that we continue to field test or get feedback on these modules. We need to maintain communication with teachers who implement the program this year.
    b. Second, the software complications must be resolved for students and teachers to implement Tree Trails in an easy-to-use format as it was promoted. We need to send a positive message to the community that this is a great program, as the evaluations demonstrate, for our students and the community to embrace and support.
    c. Third, the evaluations do indicate a real desire by teachers and students to continue this type of learning and be provided the support they need for students to learn with student-centered, authentic, performance-based and interdisciplinary learning activities.

Recommendations:

1. Usability and Revisions:
    a. Tree Trails should be revised according to input from students and teachers. This should be completed immediately. Upon completion, teachers, administrators and foresters should be notified and posted on the website as an updated Tree Trails program.
    b. Likewise, the software issues demonstrated a problem for user friendliness, and impeded preparation time and efficiency of module implementation. The issues are being resolved to make implementation easier in classrooms. Problems regarding the use of the software application by students may be resolved with the input from teachers and students concerning why they had difficulty implementing it. Much of the problems using SurveyMonkey for student pretests and posttests have been resolved. However teachers should develop a plan for computer use if there is limited availability and/or develop a plan to administer these tests using paper copies and tallying results; i.e., students self-tally and record scores to give to a teacher or peer report the class results. Again, the revisions should be announced to teachers, administrators and foresters and posted as an updated Tree Trails program.

2. Validity and reliability are challenged due to the small, localized population. The updated Tree Trails materials should continue to be field tested with a larger population of teachers and students. Although the population who field tested parts of the project

did represent a variety of student populations, disadvantage, ethnicity, and academic performance, the population was so small that a wider sampling across the state is needed to voice the merits of Tree Trails.

3. To replicate this project for success, implementation should begin with a plan to start in the fall and use the entire year to complete the modules in an order as determined by the teacher and/or staff.

4. Training and support should continue in a manner similar to what was provided in this field test. This plan could allow the program to fully develop with online support and/or human resources such as assistance of community foresters, forestry organizations and local leaders. The "Getting Started" format should include a video(s) demonstrating how to use the application (texasforestinfo.com) to map a trail on the website. In addition, this website could include a short summary of how to use SurveyMonkey or another online survey program for the student pretests and posttests.

5. The long-term impact of Tree Trails as a learning program for students is important. The project contains all the elements of what works with teachers and students.
    - It crosses content discipline borders and brings learning into one arena where students can act individually, in small cooperative groups or large discussion centers.
    - At the same time, it incorporates higher level learning strategies. It approaches learning with a systematic progressive instructional model and allows ongoing evaluation throughout the learning process.
    - Then, Tree Trails lesson modules bring all the learning back into focus through a variety of closure methods to complete the learning cycle.
    - All important learning objectives are achievable. Tree Trails creates and stimulates and promotes endless new visions of "I want to know more about … ."
    - Tree Trails must continue to receive the attention of teachers, foresters, administrators and educators of all types. Tree Trails must be promoted throughout our state, and hopefully, the nation.

APPENDICES

A. Letter to Schools

B. Teacher Project Overview

C. Teacher Training Agenda

D. Student Pretest and Posttest Sample

E. Teacher Evaluation Sample

F. Student Summative Evaluation

G. Teacher Summative Evaluation

Appendix A
Letter to Schools

May 30, 2013

Welcome to the beginning of a grand adventure! Texas A&M Forest Service (TFS) and Texas Urban Forestry Council (TUFC) are excited to expand their educational role directly into K–12 school classrooms with the Tree Trails Project. Both organizations believe strongly that youth education is the key to the success of our forests. Tree Trails is a conservation education public awareness project to create outdoor forest classrooms.

Tree Trails serves schools in the digital age with a high-tech online, easy-to-use, educationally sound project that gets kids outside and active in the environment. Tree Trails includes 10 lesson modules and provides a research-based instructional approach that integrates language arts, mathematics, science, social studies, technology and state testing measures, STAAR/TEKS, with online and outdoor activities to create learning forests at schools.

TFS and TUFC value field testing the modules to gain vital input from teachers and students necessary for establishing a strong, valid and reliable curriculum for all participants in authentic, exciting learning activities. We are looking for 10 fifth-grade teachers to field test Tree Trails. A $500 stipend for participating teachers will be awarded upon completion of the 10 lesson modules, teacher and student evaluations, and teacher recommendations and suggestions.

Dr. Frances Boutin, curriculum coordinator for the Tree Trails project and myself, Leslie Kessner, conservation education coordinator at TFS, will be implementing the field test project. If you are interested in participating in this project during Fall 2013, please contact Dr. Frances Boutin, 281.326.2333, boutin.frances@gmail.com or me, Leslie Kessner, 979.458.6649, lkessner@tfs.tamu.edu by June 10.

We hope you will join us for this outdoor forestry adventure!

Sincerely,

Leslie Kessner
Conservation Education Coordinator
Texas A&M Forest Service

Appendix B
Teacher Project Overview

Tree Trails

Pilot Project

The goal of the Tree Trails project is to develop a workable Tree Trails model with fifth-grade students that can be implemented throughout Texas, eventually resulting in a learning forest in every school.

The Tree Trails project provides a unique online opportunity for teachers and students to be involved in developing a statewide program with Texas A&M Forest Service and Texas Urban Forestry Council. The program is aligned with Texas Education Association standards and is time-efficient, cost-effective and supported by scientific research.

How It Works

Lesson modules are formatted in an easy to use, student-centered, instructional approach that is based on best practices and strategies. The instructional procedures follow the 5 E's learning cycle (R.W. Bybee). The 5 E's are excite, explore, explain, elaborate and evaluate. Instructional methods and strategies are those found to be most suitable for the activity. Each module will take two to three 45 minute sessions.

Tree Trails lesson modules will be accessible online at www.texasforestinfo.com. These connect to an online GIS mapping system where the tree trails will be mapped and data entered into the system.

The modules are:

One: Map a Tree Trail
Two: Tree Identification
Three: Tree Measurement
Four: Tree Structure and Function
Five: Benefits and Values of Trees
Six: Diversity of Species and Ecosystems
Seven: Tree and Forest Health
Eight: Tree History
Nine: Urban Forestry
Ten: Student Service Leader

To Participate

We are looking for 10 fifth-grade teachers to pilot Tree Trails, with a maximum of two teachers per school.

Participation is voluntary. Teachers agree to participate and provide feedback. The agreement requires each class to complete all 10 lesson modules with pretest and posttest evaluations for each module that are submitted online by students.

Your Rewards

The curriculum is aligned to Texas Essential Knowledge and Skills (TEKS) in reading, mathematics, science, social studies and technology application and to the State of Texas Assessments of Academic Readiness (STAAR) tests of science, mathematics and reading.

Tree Trails training and materials are provided free to participants. The training utilizes a blended model consisting of face-to-face, coaching, mentoring and online information.

Participating schools, teachers and students are awarded certificates of participation in the Tree Trails project.

A $500 stipend for participating teachers will be awarded by Texas Urban Forestry Council upon completion of the 10 lesson modules, teacher and student evaluations, and teacher recommendations and suggestions.

Contact Us

Dr. Frances Boutin
281.326.2333, boutin.frances@gmail.com

Leslie Kessner
979.458.6649, lkessner@tfs.tamu.edu

TEXAS A&M FOREST SERVICE

TEXAS URBAN FORESTRY COUNCIL

Appendix C
Teacher Training Agenda

TREE TRAILS PROJECT AGENDA

Feb. 22, 2014

9:00-11:00 a.m. UH Charter School
1:00-3:00 p.m. Stewart Elementary

1. Introduction, Purpose and Training Objective

2. Tree Trail Project Information
   - Tree Trails Overview, Modules, www.texasforestinfo.com, www.tfsweb.tamu.edu/treetrails and Evaluation

3. Teacher Practice: Modules 1-3
   I. Excite: Field Test Significance
   II. Explain: KWL for Modules 1-3: mapping, identification, measuring and recording
   III. Explore: Tree Trail Teacher Lead Team mission
      - Activity Plan: Map a trail
      - Mapping methods, ID website, Measurement methods
   IV. Extend/Elaborate:
      - Activity: select trees, pinpoint them, record data , ID trees, record, measure tree, record and discuss
   V. Evaluate:
      - KWL, Learning Logs
      - Teacher and Student Evaluation: Survey Monkey
      - Suggestions, needs and concerns

4. Conclusion:
   A. Implementation Schedule
   B. Tips:
      - Browser of choice: Mozilla Firefox or Google Chrome
      - Mobile App only an Apple app
      - Contact Information:
        Leslie Kessner: lkessner@tfs.tamu.edu
        Frances Boutin: fjboutin@gmail.com
      - Other

Appendix D
Student Pretest/Posttest Sample

Student Assessment / Pretest and Posttest

Directions:
Have students go online to SurveyMonkey and take the *Map a Tree Trail* test. Answer the following questions by rating your response 1-5, with 5 being the highest.

Key: 1 = Not Sure 2 = Poor 3 = OK 4 = Good 5 = Great

1.	I know how to develop a tree trail.	1	2	3	4	5
2.	I know how to map trees on a tree trail.	1	2	3	4	5
3.	I like to work in small groups to learn.	1	2	3	4	5
4.	Learning logs helps me use what I learn.	1	2	3	4	5
5.	I like learning activities that are outside.	1	2	3	4	5
6.	I can use technology to learn about trees.	1	2	3	4	5
7.	I know how maps tell us about our land.	1	2	3	4	5
8.	I can find my school online on the Texas Forest Information website.	1	2	3	4	5
9.	I am interested in knowing more about trees.	1	2	3	4	5
10.	I can tell how Texas A&M Forest Service helps student's learn about our trees & forests.	1	2	3	4	5

Appendix E
Teacher Evaluation Sample

Teacher Evaluation

Directions:
Please go to SurveyMonkey *Map a Tree Trail* to provide your evaluation, comments, suggestions and/or recommendations. Answer the following questions by rating your response 1-5, with 5 being the highest.

Key: 1 = Not Sure 2 = Poor 3 = OK 4 = Good 5 = Great

1.	The instructional procedures were clear.	1	2	3	4	5
2.	The timeframe was appropriate.	1	2	3	4	5
3.	The instructional strategies enhanced student learning.	1	2	3	4	5
4.	The activities were age appropriate.	1	2	3	4	5
5.	The objectives were the measurable.	1	2	3	4	5
6.	The online delivery was easy to follow.	1	2	3	4	5
7.	The online format increased student interest.	1	2	3	4	5
8.	Students' maintained interest in the lesson.	1	2	3	4	5
9.	The lesson met TEKS/STAAR measures.	1	2	3	4	5
10.	The Texas A&M Forest Service is a valuable educational resource.	1	2	3	4	5

Questions, Comments, Suggestions and/or Recommendations

Comments:

Suggestions/Recommendations:

Appendix F
Student Summative Evaluation

TREE TRAILS PROJECT STUDENTS SUMMATIVE EVALUATION
MAY 2014

School: _____Teacher:_____Class:_____
Directions: Ask each class of students to respond to the following questions. Tally their yes or no questions. Jot down verbal responses and/or tally the same responses.

1. What Tree Trails activities did you like the: (List and tally the no. of students who agree)?
    1. Most?
    2. Least?

2. What type of learning did you like (tally no. of students)
    a. Computer_____
    b. Recording personal activities such as Learning Logs _____
    c. Outdoor Experiences_____
    d. Group Work_____
    e. Creating projects_____
    f. Other (list)_____

3. If you were in charge of the Tree Trails Project, is there anything you would you do to make it better for students.

4. Is there anything else you would like to tell us about your Tree Trails experience?

Appendix G
Teacher Summative Evaluation

TREE TRAILS PROJECT TEACHER SUMMATIVE EVALUATION
May 2014

Name: _____School:_____

Directions: The Tree Trails Project future success is dependent on how well it works for teachers and students. Take time to provide your insight into each question. Program revision will be based on your expert advice. Thank you!

1. Are there any experiences or thoughts about the use of the Tree Trails Project you would like to share with us?

2. What do you consider the consequences of the Tree Trails Project on:
   a. students
   b. parents
   c. the community?

3. Would you recommend any additions to the Tree Trails Project that:
   a. could assist the Tree Trails project to "stand alone" online (without teacher training) or
   b. would assist teachers with minimal contact training to use online program?

4. What do you consider the challenges to implement the Tree Trails Project for classroom instruction with
   a. 5th grade students statewide?
   b. 3rd and 8th grade students statewide?

5. List 3 things (or more, if appropriate) that were most helpful in implementing Tree Trails.
6. List 3 things (or more, if appropriate) that were least helpful in implementing Tree Trails.
7. Other comments, suggestions and/or recommendations.