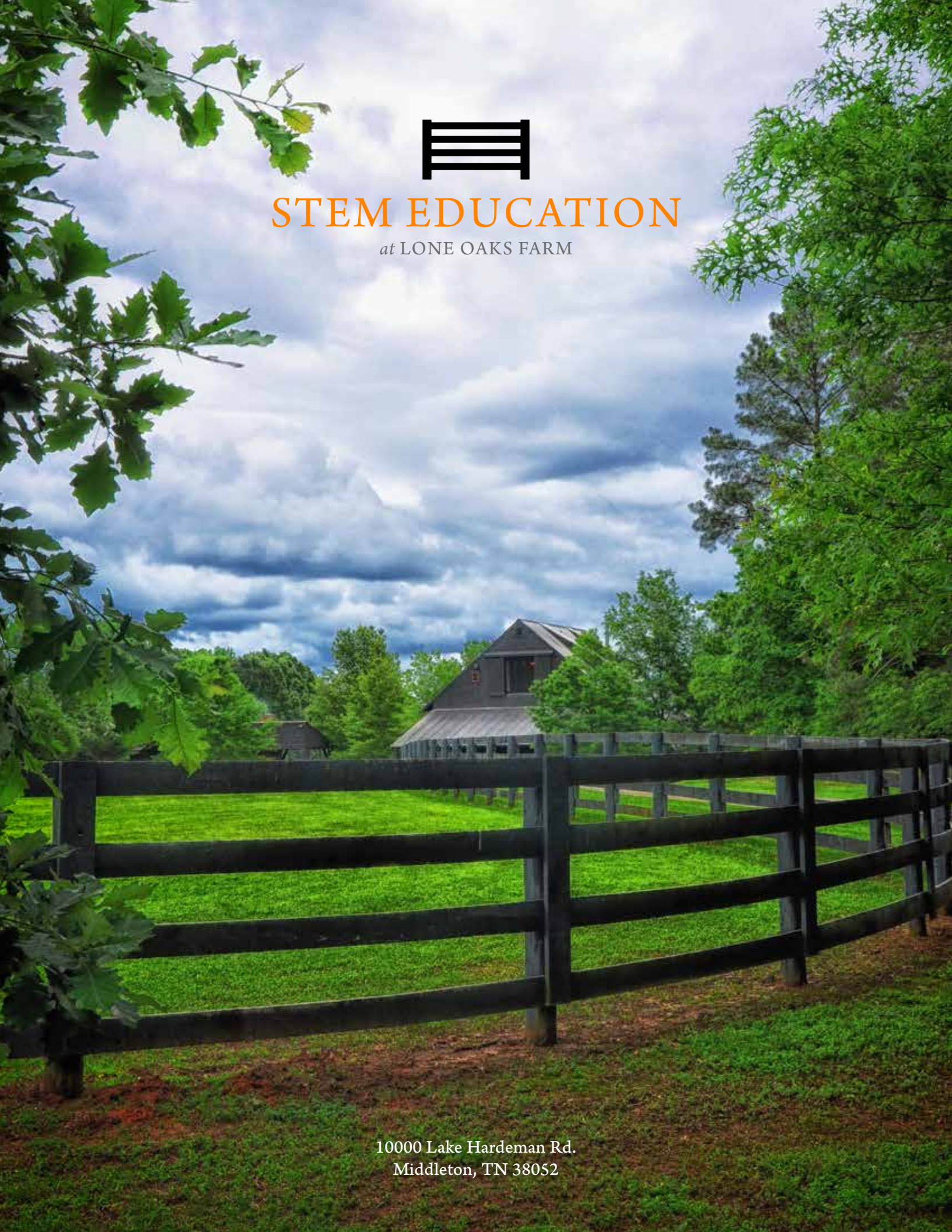


STEM EDUCATION

at LONE OAKS FARM

10000 Lake Hardeman Rd.
Middleton, TN 38052

Fun, challenging, hands-on, K-12 STEM education in an outdoor learning environment like no other.

LETTER FROM THE DIRECTOR

Dear Teachers,

We are so excited that you are considering a STEM learning experience at Lone Oaks Farm for your students! Our mission at Lone Oaks Farm is to guide students through the learning process with fun, hands-on experiences. Our ultimate goal is to teach STEM in ways that are fun, challenging, and experiential.

We offer a variety of programs that can be customized to fit the needs of your classroom. We are more than a field trip, we are an extension of your classroom. While our programs are designed to be entertaining for students, we are also here to help teachers reinforce key concepts in STEM.

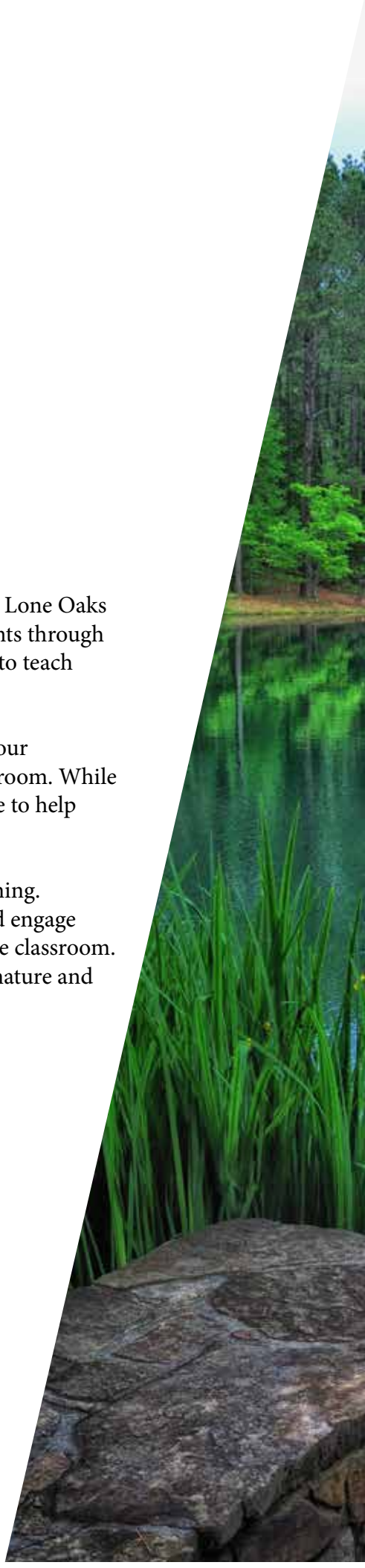
Our 1,200-acre farm offers the perfect destination for outdoor STEM learning. Students will have the opportunity to get outside, connect with nature, and engage with each other in ways that are difficult or impossible to accomplish in the classroom. While at Lone Oaks Farm, students will experience the beauty of mother nature and the natural learning environment it provides.

You can register for our programs in one of three ways,

1) fill out the contact form on our website
2) send an email to loneoaksstem@utk.edu
3) phone us at 731-376-0011

We look forward to seeing you at Lone Oaks Farm!

Penny Russell
STEM Program Leader



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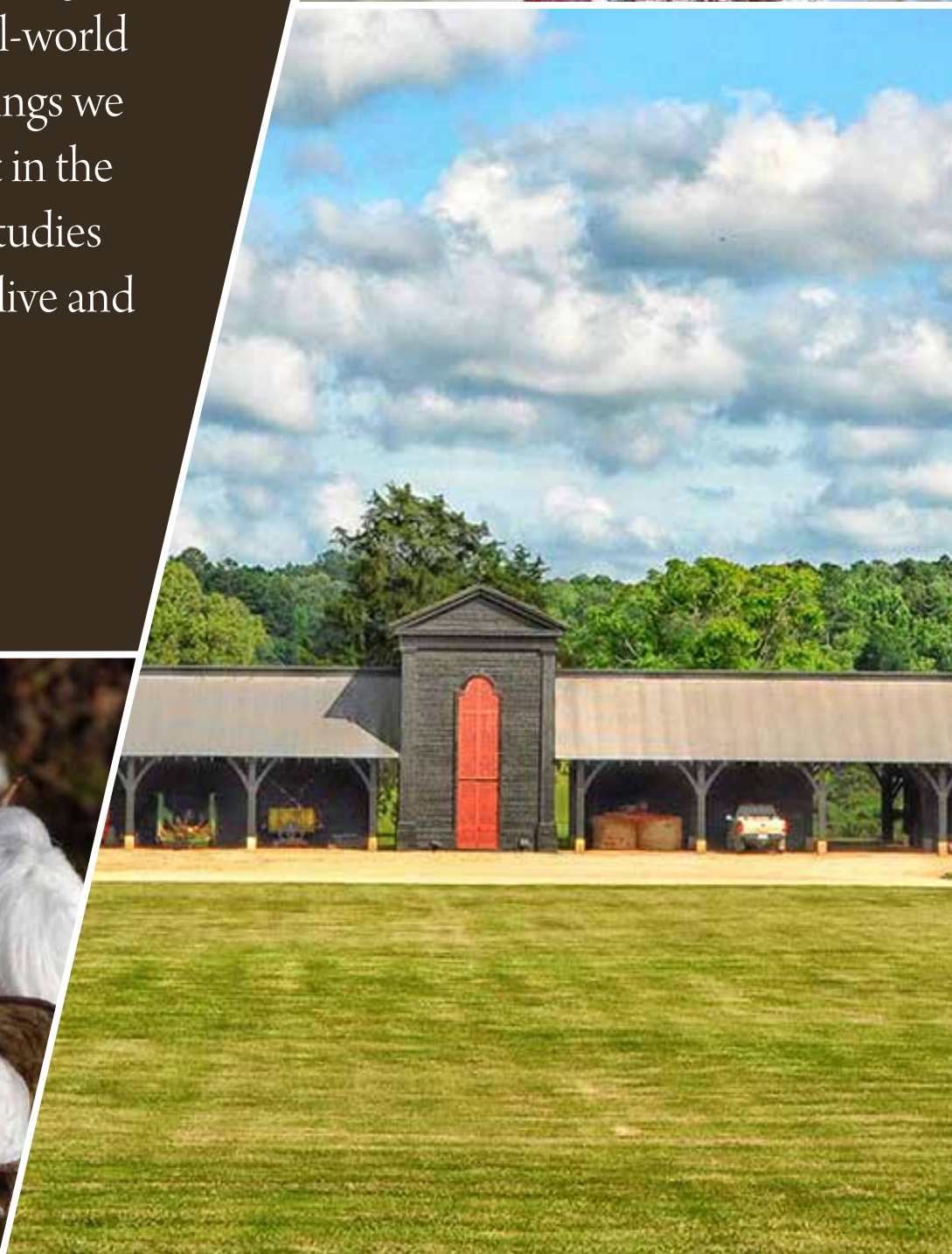
Our students absolutely LOVED the experience! Thank you for providing our students with a real-world encounter with things we are learning about in the classroom. Our studies will now become alive and relevant



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PRE-K TO KINDERGARTEN

INTRODUCTION TO STEM AT LONE OAKS FARM

Our introduction program is designed to feed the immense curiosity found in young children. This program will have your students engaging and connecting with nature while providing them with an introduction into STEM education. While on the farm, your students will have the opportunity to learn about nature's natural habitats and how to create their very own little habitats. Depending on the time of year, students will use the color wheel to find the many colors of nature that Lone Oaks Farm has to offer. This program also includes a reading session outdoors overlooking "The Lost Pond!" We will work with you to customize your experience to fit the needs of your students and your classroom learning.

STANDARDS	K.ETS1, K.ETS2

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about ecosystems, food webs, and nature's ability to recycle. At this level, the program encourages students to embrace the outdoors and serves as a basic introduction to the world of entomology. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	K.LS1.2, K.LS1.3, K.LS3.1

INTRODUCTION TO PHOTOSYNTHESIS

Our Introduction to Photosynthesis serves as a very basic investigation into photosynthesis. Using colored pasta, we will guide students through an interactive game to help them visualize the importance of each part of the cycle. Students will be introduced to the basic scientific process associated with photosynthesis. We will encourage students to explore and observe different plants and how each plant must compete and adapt in nature on a nature walk.

STANDARDS	K.LS3.1

> “I had so much fun at Lone Oaks Farm. I liked it because they talked about nature and I love to learn about nature.

FARM TO TABLE EXPERIENCE

The Farm to Table program encourages students to see the connection between what we eat and where it comes from. Students will experience the Lone Oaks Farm farming process from start to finish with soybeans, cotton, corn, eggs, and cattle. Students will gain hands-on experience while interacting with some of our farm animals, collecting and cooking eggs, and making their very own butter. Depending on availability, students will also be able to tour the farm on a unique hayride.

STANDARDS	K.PS1, K.LS3

PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the “stream table” to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	K.ESS3.3, K.ETS1.1

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, “Where did the delta’s sediment come from?”, “How do changes upstream affect the delta?”, and “How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?” Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	K.ESS3.3, K.ETS1.1

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	K.ESS3.3, K.ETS1.1

HYDROPONICS

Students get to experience the art of growing food hydroponically with this fascinating program. Students will first visit and learn about our aeroponic tower, then they will get to be a part of taking care of its plants! They will even get the opportunity to make their own hydroponic plant pot to take back to school with them!

STANDARDS	K.ESS3.3, K.ETS1.1, K.ETS2.1

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	K.ESS3.3, K.ETS1.1, K.ETS2.1

“

If this is science . . . I want to be a scientist!

1

1ST GRADE

INTRODUCTION TO STEM AT LONE OAKS FARM

Our introduction program is designed to feed the immense curiosity found in young children. This program will have your students engaging and connecting with nature while providing them with an introduction into STEM education. While on the farm, your students will have the opportunity to learn about nature's natural habitats and how to create their very own little habitats. Depending on the time of year, students will use the color wheel to find the many colors of nature that Lone Oaks Farm has to offer. This program also includes a reading session outdoors overlooking "The Lost Pond!" We will work with you to customize your experience to fit the needs of your students and your classroom learning.

STANDARDS	1.LS1, 1.LS2, 1.ETS1, 1.ETS2

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about ecosystems, food webs, and nature's ability to recycle. At this level, the program encourages students to embrace the outdoors and serves as a basic introduction to the world of entomology. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	1.PS3, 1.LS1, 1.LS2, 1.ETS1, 1.ETS2

INTRODUCTION TO PHOTOSYNTHESIS

Our Introduction to Photosynthesis serves as a very basic investigation into photosynthesis. Using colored pasta, we will guide students through an interactive game to help them visualize the importance of each part of the cycle. Students will be introduced to the basic scientific process associated with photosynthesis. Using a nature walk, we will encourage students to explore and observe different plants and how each plant must compete and adapt in nature.

STANDARDS	1.PS3, 1.LS1, 1.LS2, 1.ETS1, 1.ETS2

> “I really enjoyed the trip to Lone Oaks Farm. My favorite things I did there was When I held a chicken and played Ga Ga Ball. I also liked petting the snake. I really liked seeing the sale barn too. I would definitely recommend Lone Oaks Farm.

FARM TO TABLE EXPERIENCE

The Farm to Table program encourages students to see the connection between what we eat and where it comes from. Students will experience the Lone Oaks Farm farming process from start to finish with soybeans, cotton, corn, eggs, and cattle. Students will gain hands-on experience while interacting with some of our farm animals, collecting and cooking eggs, and making their very own butter. Depending on availability, students will also be able to tour the farm on a unique hayride.

STANDARDS	1.LS1, 1.LS2

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will then use their knowledge to help them match adult insects with the different stages of metamorphosis. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	1.PS4, 1.LS1, 1.LS2, 1.ETS1, 1.ETS2

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the “stream table” to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	1.ETS1.1, 1.ETS2.1

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. Our Scoop on Water and Soil program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	1.PS3, 1.PS4, 1.LS1, 1.LS2, 1.ETS1

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, "Where did the delta's sediment come from?", "How do changes upstream affect the delta?", and "How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?" Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	1.ETS1.1, 1.ETS2.1

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	1.ETS1.1, 1.ETS2.1

HYDROPONICS

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STANDARDS	1.LS2.3, 1.ETS1.1, 1.ETS2.1

PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	1.LS2.3, 1.ETS1.1, 1.ETS2.1

2

2ND GRADE

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about ecosystems, food webs, and nature's ability to recycle. At this level, the program encourages students to embrace the outdoors and serves as a basic introduction to the world of entomology. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	2.LS1, 2.LS2, 2.ETS1, 2.ETS2, 2.ESS2

INTRODUCTION TO PHOTOSYNTHESIS

Our Introduction to Photosynthesis serves as a very basic investigation into photosynthesis. Using colored pasta, we guide students through an interactive game to help them visualize the importance of each part of the cycle. Students will be introduced to the basic scientific process associated with photosynthesis. Using a nature walk, we will encourage students to explore and observe different plants and how each plant must compete and adapt in nature.

STANDARDS	2.LS1, 2.LS2, 2.ETS1, 2.ETS2

FARM TO TABLE EXPERIENCE

The Farm to Table program encourages students to see the connection between what we eat and where it comes from. Students will experience the Lone Oaks Farm farming process from start to finish with soybeans, cotton, corn, eggs, and cattle. Students will gain hands-on experience while interacting with some of our farm animals, collecting and cooking eggs, and making their very own butter. Depending on availability, students will also be able to tour the farm on a unique hayride.

STANDARDS	2.LS1.1, 2.LS1.2, 2.LS1.3, 2.LS2

> “What a great opportunity for all those who visit Lone Oaks Farm.

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will then use their knowledge to help them match adult insects with the different stages of metamorphosis. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	2.LS1, 2.LS2, 2.LS3, 2.ETS1, 2.ETS2, 2.ESS2

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	2.LS1, 2.LS2, 2.ESS1, 2.ESS2

HYDROPONICS

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STANDARDS	2.ETS2.1

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the "stream table" to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	2.ESS2.1, 2.ETS2.1

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, "Where did the delta's sediment come from?", "How do changes upstream affect the delta?", and "How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?" Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	2.ESS2.1, 2.ETS1.1, 2.ETS2.1

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	2.ESS2.1, 2.ETS1.1,2.ETS2.1

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	2.ESS2.1, 2.ETS1.1, 2.ETS2.1

PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

“

My favorite thing at Lone Oaks was feeling and playing with the animal skins. I would have loved to have more time to dig for bugs and or insects.

3

3RD GRADE

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about the interactions between insects within a certain ecosystem , food webs, and nature's ability to recycle. Students will be able to bring insect specimens back to the STEM building and use the Dino-Lite Digital Microscope to analyze them more closely. Students will be able to see the external and possibly the internal structures the insect uses for survival, growth, behavior, and reproduction. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	3.LS1, 3.LS2, 3.LS4

INTRODUCTION TO PHOTOSYNTHESIS

Our Introduction to Photosynthesis serves as a very basic investigation into photosynthesis. Using colored pasta, we guide students through an interactive game to help them visualize the importance of each part of the cycle. Students will be introduced to the basic scientific process associated with photosynthesis. Using a nature walk, we will encourage students to explore and observe different plants and how each plant must compete and adapt in nature.

STANDARDS	3.LS1, 3.LS2, 3.LS4

FARM TO TABLE EXPERIENCE

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STANDARDS	3.LS1

> “Awesome!! Thanks to the awesome team at Lone Oaks Farm for such fantastic programs!

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will then use their knowledge to help them match adult insects with the different stages of metamorphosis. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	3.LS1, 3.LS2, 3.LS4, 3.ESS3

COMPOSTING, RECYCLING, & POLLUTION

Your students may think they know about recycling and pollution, but do they really know the impact of the two on our future? Through this program, students will gain a better understanding of how mother nature recycles. Students will have the opportunity to build a compost bin, learn about the science involved in breaking down food, and the energy it takes to do so.

STANDARDS	3.PS1, 3.PS3, 3.LS2, 3.ETS1, 3.ETS2

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	3.PS1, 3.ESS2, 3.ESS3

GPS OWL SCAVENGER HUNT

In this activity, students will put their skills to the test as they learn about how GPS receivers work! Students will participate in a race to find owls mounted on trees in the woods using handheld GPS receivers. This activity gives students a chance to exercise their teamwork skills, leadership ability, and application of scientific principles. As they work through clues on this course, students will also gain a better understanding of global positioning systems, geographic positioning with satellites, and geography.

STANDARDS	3.ETS2.1

WHY IS RIVER CHANNELIZATION BAD?

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STANDARDS	3.ESS3.1

DELTA FORMATION

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STANDARDS	3.ESS3.1

WHY DO RIVERS MEANDER?

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STANDARDS	3.ESS3.1

HYDROPONICS

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STANDARDS	3.ESS3.1, 3.ESS3.2, 3.ETS1.1, 3.ETS1.2

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	3.ESS3.1, 3.ESS3.2, 3.ETS1.1, 3.ETS1.2

SOIL TEXTURE

In this program, students will learn all about soil texture and how it can indicate how well the soil can hold nutrients and water that plants need to grow! Using soil sieves, students will get to investigate and examine their soil samples. They will then use math to determine the composition of the soil and classify it with a Soil Texture Triangle Chart!

STANDARDS	3.PS1.3, 3.LS4.2, 3.MD.A.2

PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

4

4TH GRADE

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about the interactions between insects within a certain ecosystem, food webs, and nature's ability to recycle. Students will be able to bring insect specimens back to the STEM building and use the Dino-Lite Digital Microscope to analyze them more closely, allowing them to see the external and possibly the internal structures the insect uses for survival, growth, behavior, and reproduction. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	4.LS2, 4.LS4

INTRODUCTION TO PHOTOSYNTHESIS I

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STANDARDS	4.LS2

FARM TO TABLE EXPERIENCE

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STANDARDS	4.LS2

"It's an amazing place providing wonderful experiences for our students

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will then use their knowledge to help them match adult insects with the different stages of metamorphosis. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	4.LS2

COMPOSTING, RECYCLING, & POLLUTION

Your students may think they know about recycling and pollution, but do they really know the impact of the two on our future? Through this program, students will gain a better understanding of how mother nature recycles. Students will have the opportunity to build a compost bin, learn about the science involved in breaking down food, and the energy it takes to do so.

STANDARDS	4.PS3, 4.ESS34, 4.ETS2

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	4.ESS2, 4.ESS3

COOKING WITH CHEMISTRY

Science and Math can be found in every recipe, happening at each holiday gathering, and at the Lone Oaks Farm Industrial Kitchen! The mathematics and science in recipes often goes unnoticed as a teaching tool. In reality, there is an abundance of math and science skills involved in cooking and baking. Culinary mathematics is the application of basic math principles, such as addition, subtraction, multiplication, and division in day to day work within the food industry. Our Cooking with Chemistry program is available as an introductory lesson or a way to bring your lesson into a hands-on environment where students can get a physical representation of math and chemistry.

STANDARDS	4.NF.A.1, 4.ESS2.4

HYDROPONICS

Students get to experience the art of growing food hydroponically with this fascinating program. Students will first visit and learn about our aeroponic tower, then they will get to be a part of taking care of its plants! They will even get the opportunity to make their own hydroponic plant pot to take back to school with them!

STANDARDS	4.ESS3.2, 4.ESS2.3

GPS OWL SCAVENGER HUNT

In this activity, students will put their skills to the test as they learn about how GPS receivers work! Students will participate in a race to find owls mounted on trees in the woods using handheld GPS receivers. This activity gives students a chance to exercise their teamwork skills, leadership ability, and application of scientific principles. As they work through clues on this course, students will also gain a better understanding of global positioning systems, geographic positioning with satellites, and geography.

STANDARDS	4.ETS1.3

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the “stream table” to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	4.ESS2.1, 4.ESS3.2

SOIL TEXTURE

In this program, students will learn all about soil texture and how it can indicate how well the soil can hold nutrients and water that plants need to grow! Using soil sieves, students will get to investigate and examine their soil samples. They will then use math to determine the composition of the soil and classify it with a Soil Texture Triangle Chart!

STANDARDS	4.ESS2.1, 4.NBT.A.3

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	4.ESS2.1, 4.ESS3.2

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, "Where did the delta's sediment come from?", "How do changes upstream affect the delta?", and "How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?" Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	4.ESS2.1, 4.ESS3.2

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	4.ESS2.1, 4.ESS3.2

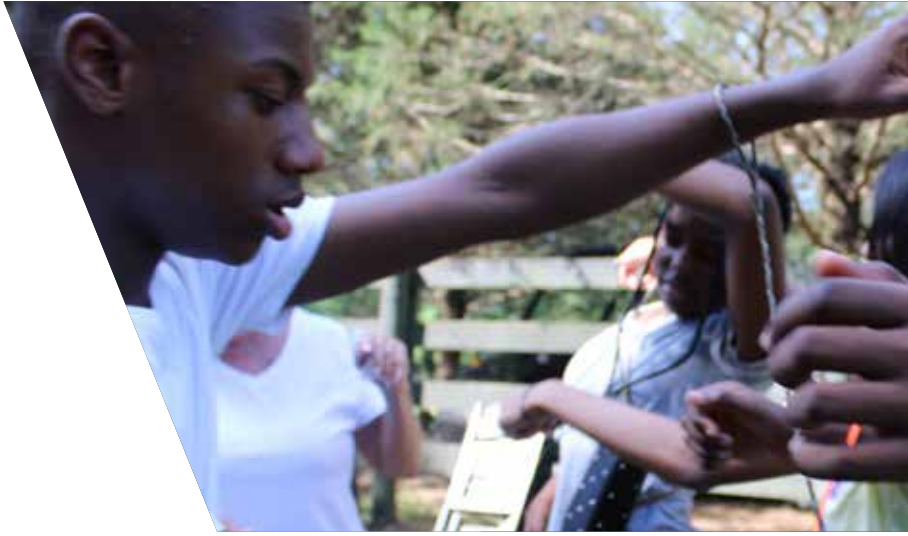
PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

5

5TH GRADE



LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about the interactions between insects within a certain ecosystem , food webs, and nature's ability to recycle. Students will be able to bring insect specimens back to the STEM building and use the DinoLite to analyze them more closely. Students will be able to see the external and possibly the internal structures an insect uses for survival, growth, behavior, and reproduction. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	5.LS1, 5.LS3, 5.LS4, 5.ETS1, 5.ETS2

INTRODUCTION TO PHOTOSYNTHESIS I

Photosynthesis is one of the most important and complex processes in all of biology. However, there are some simple rules and fun interacting games that can help your student understand this chemical reaction. Our Introduction to Photosynthesis program will guide students through the requirements, stages, and chemical equation it takes to make the complex cycle of photosynthesis happen. Students will be able to see first hand the results of photosynthesis all around them here at Lone Oaks Farm.

STANDARDS	5.LS1, 5.LS3, 5.LS4, 5.ETS1, 5.ETS2

FARM TO TABLE EXPERIENCE

The Farm to Table program encourages students to see the connection between what we eat and where it comes from. Students will experience the Lone Oaks Farm farming process from start to finish with soybeans, cotton, corn, eggs, and cattle. Students will gain hands-on experience while interacting with some of our farm animals, collecting and cooking eggs, and making their very own butter. Depending on availability, students will also be able to tour the farm on a unique hayride.

STANDARDS	5.PS1, 5.LS1

"So much fun in learning!!

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will then use their knowledge to help them match adult insects with the different stages of metamorphosis. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	5.LS1, 5.LS3, 5.LS4, 5.ETS1, 5.ETS2

COMPOSTING, RECYCLING, & POLLUTION

Your students may think they know about recycling and pollution, but do they really know the impact of the two on our future? Through this program, students will gain a better understanding of how mother nature recycles. Students will have the opportunity to build a compost bin, learn about the science involved in breaking down food, and the energy it takes to do so.

STANDARDS	5.PS2

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	5.PS1, 5.PS2, 5.LS4, 5.ETS1, 5.ETS2

COOKING WITH CHEMISTRY

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STANDARDS	5.PS1 *This program will address common computation math skills as well. Students will work with fractional parts associated with recipes as well as measurements of solids and liquids.

GPS OWL SCAVENGER HUNT

In this activity, students will put their skills to the test as they learn about how GPS receivers work! Students will participate in a race to find owls mounted on trees in the woods using handheld GPS receivers. This activity gives students a chance to exercise their teamwork skills, leadership ability, and application of scientific principles. As they work through clues on this course, students will also gain a better understanding of global positioning systems, geographic positioning with satellites, and geography.

STANDARDS	5.ETS1.3, 5.ETS2.2

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the “stream table” to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	5.ETS1.3

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, “Where did the delta’s sediment come from?”, “How do changes upstream affect the delta?”, and “How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?” Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	5.ETS1.3

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	5.ETS1.3

HYDROPONICS

Students get to experience the art of growing food hydroponically with this fascinating program. Students will first visit and learn about our aeroponic tower, then they will get to be a part of taking care of its plants! They will even get the opportunity to make their own hydroponic plant pot to take back to school with them!

STANDARDS	5.ETS1.3, 5.ETS2.3

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	5.ETS1.1, 5.ETS1.2, 5.ETS1.3

PURE RECREATION

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STANDARDS	NONE

6

6TH GRADE

LIFE UNDER A LOG

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STANDARDS	6.LS2, 6.LS4, 6.ESS2, 6.ESS3, 6.ETS1

INTRODUCTION TO PHOTOSYNTHESIS II

Photosynthesis is one of the most important and complex processes in all of biology. However, there are some simple rules and fun interacting games that can help your student understand this chemical reaction. Our Introduction to Photosynthesis program will guide students through the requirements, stages, and chemical equation it takes to make the complex cycle of photosynthesis happen. Students will be able to see first hand the results of photosynthesis all around them here at Lone Oaks Farm.

STANDARDS	6.LS2, 6.LS4, 6.ESS2, 6.ESS3, 6.ETS1

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	6.LS4, 6.ESS2, 6.ESS3, 6.ETS1

> “Our students were immersed in nature as they learned about producers, consumers, decomposers, & other biotic and abiotic elements in aquatic and Forrest ecosystems.

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	6.LS2, 6.LS4, 6.ESS2, 6.ESS3, 6.ETS1

COMPOSTING, RECYCLING, & POLLUTION

Your students may think they know about recycling and pollution, but do they really know the impact of the two on our future? Through this program, students will gain a better understanding of how mother nature recycles. Students will have the opportunity to build a compost bin, learn about the science involved in breaking down food, and the energy it takes to do so.

STANDARDS	6.LS2, 6.ESS3

PURE RECREATION

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STANDARDS	NONE

COOKING WITH CHEMISTRY

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STANDARDS	6.PS3.4 *This program will address common computation math skills as well. Students will work with fractional parts associated with recipes as well as measurements of solids and liquids.

TEAM BUILDING & LEADERSHIP

The real benefits of team building activities are providing youth with those essential life skills. Problem solving, working together, empathy towards others, and leadership skills will be vital for their future. Your students will come together to achieve the goal set before them; while learning to smile and have fun together in challenging situations.

STANDARDS	NONE

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the “stream table” to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	6.ESS3.2, 6.ETS1.1

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, “Where did the delta’s sediment come from?”, “How do changes upstream affect the delta?”, and “How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?” Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	6.ESS3.2, 6.ETS1.1

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	6.ESS3.2, 6.ETS1.1

HYDROPONICS

Students get to experience the art of growing food hydroponically with this fascinating program. Students will first visit and learn about our aeroponic tower, then they will get to be a part of taking care of its plants! They will even get the opportunity to make their own hydroponic plant pot to take back to school with them!

STANDARDS	6.ESS3.2, 6.ETS1.1

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	6.ESS3.2, 6.ETS1.1

SOIL TEXTURE

In this program, students will learn all about soil texture and how it can indicate how well the soil can hold nutrients and water that plants need to grow! Using soil sieves, students will get to investigate and examine their soil samples. They will then use math to determine the composition of the soil and classify it with a Soil Texture Triangle Chart!

STANDARDS	6.LS2.1, 6.NS.B.2

7

7TH GRADE

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about the interactions between insects within a certain ecosystem , food webs, and nature's ability to recycle. This program gives students a look at the biodiversity of an ecosystem. Students will be able to bring insect specimens back to the STEM building and use the DinoLite to analyze them more closely. Students will be able to see the external and possibly the internal structures an insect uses for survival, growth, behavior, and reproduction. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	7.LS1, 7.LS2, 7.SP.A.2

INTRODUCTION TO PHOTOSYNTHESIS II

Photosynthesis is one of the most important and complex processes in all of biology. However, there are some simple rules and fun interacting games that can help your student understand this chemical reaction. Our Introduction to Photosynthesis program will guide students through the requirements, stages, and chemical equation it takes to make the complex cycle of photosynthesis happen. Students will be able to see first hand the results of photosynthesis all around them here at Lone Oaks Farm.

STANDARDS	7.LS1.9, 7.EE.B.4a

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	7.LS2

"There were many positive results during and after our gifted field trip. During the trip, the students became one group, instead of being from separate schools. They learned to work together to accomplish a goal.

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	7.LS1, 7.SP.A.2

COMPOSTING, RECYCLING, & POLLUTION

Your students may think they know about recycling and pollution, but do they really know the impact of the two on our future? Through this program, students will gain a better understanding of how mother nature recycles. Students will have the opportunity to build a compost bin, learn about the science involved in breaking down food, and the energy it takes to do so.

STANDARDS	7.ESS3.1, 7.ESS3.2, 7.RP.A.1, 7.RP.A.2

ANIMAL PRODUCTION PROGRAM

Our Animal Production Program allows students to see the working side of Lone Oaks Farm. Through this program, students learn about the beef industry and why we do what we do at Lone Oaks Farm. ***This program is very time specific and serves smaller groups.*** This particular program involves our very own cattle producer, AI tech, and farm crew. During this program, students will have the opportunity to learn about cattle vaccinations, ultrasounds, and artificial insemination at the Lone Oaks Farm Cattle Barn.

STANDARDS	7.LS.1.3/6/7, 7.LS3.2

COOKING WITH CHEMISTRY

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STANDARDS	7.PS1.1-6, 7.RP.A.1, 7.RP.A.2 *This program will address common computation math skills as well. Students will work with fractional parts associated with recipes as well as measurements of solids and liquids.

TRANSITS/COMPASS MAPPING & ORIENTEERING

Attention all math, science, and geography teachers! This program can be an all day or split into two.

Transits: If your students need a real world example of slopes and erosion, this program is a great addition to the classroom. Students will be instructed in how to use a transit level, an optical instrument, or a telescope, complete with a built-in spirit level that is mounted on a tripod, and is a great asset Lone Oaks Farm has for teaching slopes. Transit levels are used mainly in surveying to determine differences in surface or object height for construction projects, farming or plumbing and utility installations where it is necessary to determine slope, but they can be used to determine the relative position of lines and objects and provide readings of angles in precise measurements. Students will first establish a reference line, with subsequent readings taken at various distances and use basic mathematical calculations to determine the difference from the data collected. Students will need to use teamwork to collect data to determine the angles of a slope using basic math and logic skills. Students will then learn how to take the collected data and translate the data to find the connection between slope of a landscape, water runoff, erosion, and sediment control — bringing science and math to life.

Compass Mapping & Orienteering: The world is a vast space of adventure and discovery but it can be overwhelming to find your place in the world when you're young. In this program, your students will learn vital map reading skills and navigation proficiencies, all while using the math concepts from the classroom. Despite the popularity of the digital mapping programs, paper maps are still widely used for many jobs and outdoor recreation. At the end of the program, your students will use compasses and a map to navigate and find orienteering markers that will reinforce map navigation skills with a strong real-world visual and connection to maps.

STANDARDS	7.LS1.3, 7.EE.B.4

TEAM BUILDING & LEADERSHIP

The real benefits of team building activities are providing youth with those essential life skills. Problem solving, working together, empathy towards others, and leadership skills will be vital for their future. Your students will come together to achieve the goal set before them; while learning to smile and have fun together in challenging situations.

STANDARDS	NONE

INTRODUCTION INTO FORESTRY

The importance of forests cannot be underestimated. We depend on forests for our survival, from the air we breathe to the wood we use. Besides providing habitats for animals and livelihoods for humans, forests also offer watershed protection, prevent soil erosion and mitigate climate change. Our Introduction into Forestry program will connect your students with nature while learning how to use a Biltmore Stick! Your students will use the Biltmore stick to find the circumference of a selected tree and how many 16ft logs that particular tree would produce. Based on this information, students can determine which trees bring in the most money at a lumber yard. Students will learn how to take a tree core sample, determine the age of the tree, and determine the size of the root system. The Introduction to Forestry program incorporates several mathematical skills as well.

STANDARDS	7.LS1, 7.RP.A.1, 7.RP.A.2, 7.NS.A.1, 7.G.A.1

ELECTRO-SHOCKING USING A SHOCK BOAT

This program allows your student to dive into the world of a Fishery Biologist. Fishery Biologists study a variety of fish and supervise efforts to conserve natural habitats. They often will use a shock boat to research and study fish populations in streams, rivers, and lakes. At Lone Oaks Farm, students will get to experience this first hand as they use the shock boat in our Big Lake. In small groups, students will board our shock boat and head out to the lake to collect fish samples. Students will have the opportunity to weigh, ID, and measure their collection sample in order to determine the quality of the lake and health of the fish.

STANDARDS	7.LS1

COTTON/SOYBEAN PRODUCTION & CROP SCIENCE

Students will become a Research Scientist for a day! Your apprentice will encounter questions like “How much cotton does it take to make a t-shirt?”. This is when the scientific method comes in! Observation & Question: your students will need to determine 1) what question or questions to ask 2) what data is needed to answer the question and 3) what tools are needed to obtain that answer. Hypothesis: your students will quickly discover that there is more than one question and method to this madness! Collecting the Data: your students will use different techniques for collecting, measuring, and weighing Lone Oaks cotton. They will need teamwork and good communication to formulate a plan, distribute the work within the group, and execute — all while connecting to nature! Calculations and Conclusion: The last step will be to assemble as one group at the S.T.E.M Center and present the results to their peers. Once all the data is presented, the students will encounter a math equation that will expand their minds and introduce math in a real-world and hands-on equation.

STANDARDS	7.LS1.3/6, 7.RP.A.1, 7.RP.A.2

PURE RECREATION

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STANDARDS	NONE

SOIL TEXTURE

In this program, students will learn all about soil texture and how it can indicate how well the soil can hold nutrients and water that plants need to grow! Using soil sieves, students will get to investigate and examine their soil samples. They will then use math to determine the composition of the soil and classify it with a Soil Texture Triangle Chart!

STANDARDS	7.RP.A.3

“

Lone Oaks Farm serves as an anchor and provides real life experiences for our students to look back on when we are teaching in the classroom.

8

8TH GRADE

LIFE UNDER A LOG

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STANDARDS	8.LS4

INTRODUCTION TO PHOTOSYNTHESIS II

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STANDARDS	8.LS4

THE SCOOP ON WATER AND SOIL

Soil is critical for life in our ecosystems and plays an important role in everyday life. Soil acts as a water filtrator, a growing medium, it holds nutrients, provides a habitat for billions of organisms, and supplies most of the antibiotics used to fight diseases. Soil is the basis of our nation's agroecosystems, which provides us with fiber, food, and fuel. This program encourages students to get down and dirty as they collect, test, and categorize soil samples while learning about erosion, profiles, and minerals.

STANDARDS	8.EES2.3

> My students were able to experience electroshocking of the fish. All the students got to touch, measure, weigh, and record data. They became problem solvers, scientist, explores, and active participants throughout the learning experience.

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will use a water quality scorecard to determine water quality classifications. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	8.LS4

COMPOSTING, RECYCLING, & POLLUTION

Your students may think they know about recycling and pollution, but do they really know the impact of the two on our future? Through this program, students will gain a better understanding of how mother nature recycles. Students will have the opportunity to build a compost bin, learn about the science involved in breaking down food, and the energy it takes to do so.

STANDARDS	MS-ESS3-3

ANIMAL PRODUCTION PROGRAM

Our Animal Production Program allows students to see the working side of Lone Oaks Farm. Through this program, students learn about the beef industry and why we do what we do at Lone Oaks Farm. ***This program is very time specific and serves smaller groups.*** This particular program involves our very own cattle producer, AI tech, and farm crew. During this program, students will have the opportunity to learn about cattle vaccinations, ultrasounds, and artificial insemination at the Lone Oaks Farm Cattle Barn.

STANDARDS	8.LS4.5

COOKING WITH CHEMISTRY

Science and Math can be found in every recipe, happening at each holiday gathering, and at the Lone Oaks Farm Industrial Kitchen! The mathematics and science in recipes often goes unnoticed as a teaching tool. In reality, there is an abundance of math and science skills involved in cooking and baking. Culinary mathematics is the application of basic math principles, such as addition, subtraction, multiplication, and division in day to day work within the food industry. Our Cooking with Chemistry program is available as an introductory lesson or a way to bring your lesson into a hands-on environment where students can get a physical representation of math and chemistry.

STANDARDS	MS-PS1-2 *This program will address common computation math skills as well. Students will work with fractional parts associated with recipes as well as measurements of solids and liquids.

TRANSITS/COMPASS MAPPING & ORIENTEERING

Attention all math, science, and geography teachers! This program can be an all day or split into two.

Transits: If your students need a real world example of slopes and erosion, this program is a great addition to the classroom. Students will be instructed in how to use a transit level, an optical instrument, or a telescope, complete with a built-in spirit level that is mounted on a tripod, and is a great asset Lone Oaks Farm has for teaching slopes. Transit levels are used mainly in surveying to determine differences in surface or object height for construction projects, farming or plumbing and utility installations where it is necessary to determine slope, but they can be used to determine the relative position of lines and objects and provide readings of angles in precise measurements. Students will first establish a reference line, with subsequent readings taken at various distances and use basic mathematical calculations to determine the difference from the data collected. Students will need to use teamwork to collect data to determine the angles of a slope using basic math and logic skills. Students will then learn how to take the collected data and translate the data to find the connection between slope of a landscape, water runoff, erosion, and sediment control — bringing science and math to life.

Compass Mapping & Orienteering: The world is a vast space of adventure and discovery but it can be overwhelming to find your place in the world when you're young. In this program, your students will learn vital map reading skills and navigation proficiencies, all while using the math concepts from the classroom. Despite the popularity of the digital mapping programs, paper maps are still widely used for many jobs and outdoor recreation. At the end of the program, your students will use compasses and a map to navigate and find orienteering markers that will reinforce map navigation skills with a strong real-world visual and connection to maps.

STANDARDS	8.ESS3.2, 8.EE.B.6

TEAM BUILDING & LEADERSHIP

The real benefits of team building activities are providing youth with those essential life skills. Problem solving, working together, empathy towards others, and leadership skills will be vital for their future. Your students will come together to achieve the goal set before them; while learning to smile and have fun together in challenging situations.

STANDARDS	NONE

INTRODUCTION INTO FORESTRY

The importance of forests cannot be underestimated. We depend on forests for our survival, from the air we breathe to the wood we use. Besides providing habitats for animals and livelihoods for humans, forests also offer watershed protection, prevent soil erosion and mitigate climate change. Our Introduction into Forestry program will connect your students with nature while learning how to use a Biltmore Stick! Your students will use the Biltmore stick to find the circumference of a selected tree and how many 16ft logs that particular tree would produce. Based on this information, students can determine which trees bring in the most money at a lumber yard. Students will learn how to take a tree core sample, determine the age of the tree, and determine the size of the root system. The Introduction to Forestry program incorporates several mathematical skills as well.

STANDARDS	8.G.A.1

ELECTRO-SHOCKING USING A SHOCK BOAT

This program allows your student to dive into the world of a Fishery Biologist. Fishery Biologists study a variety of fish and supervise efforts to conserve natural habitats. They often will use a shock boat to research and study fish populations in streams, rivers, and lakes. At Lone Oaks Farm, students will get to experience this first hand as they use the shock boat in our Big Lake. In small groups, students will board our shock boat and head out to the lake to collect fish samples. Students will have the opportunity to weigh, ID, and measure their collection sample in order to determine the quality of the lake and health of the fish.

STANDARDS	8.PS2

COTTON/SOYBEAN PRODUCTION & CROP SCIENCE

Students will become a Research Scientist for a day! Your apprentice will encounter questions like “How much cotton does it take to make a t-shirt?”. This is when the scientific method comes in! Observation & Question: your students will need to determine 1) what question or questions to ask 2) what data is needed to answer the question and 3) what tools are needed to obtain that answer. Hypothesis: your students will quickly discover that there is more than one question and method to this madness! Collecting the Data: your students will use different techniques for collecting, measuring, and weighing Lone Oaks cotton. They will need teamwork and good communication to formulate a plan, distribute the work within the group, and execute — all while connecting to nature! Calculations and Conclusion: The last step will be to assemble as one group at the S.T.E.M Center and present the results to their peers. Once all the data is presented, the students will encounter a math equation that will expand their minds and introduce math in a real-world and hands-on equation.

STANDARDS	8.EE.B.6, 8.F.B.4

PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

9-12

9TH-12TH GRADES

LIFE UNDER A LOG

Our Life Under a Log program invites students to become investigators of nature. Students will put on their entomologist hats and head to the woods to discover a plethora of insects in their natural habitats. Students will investigate above, below, and inside a decomposing log for decomposers, consumers, and producers. They will learn about the interactions between insects within a certain ecosystem , food webs, and nature's ability to recycle. This program gives students a look at the biodiversity of an ecosystem. Students will be able to bring insect specimens back to the STEM building and use the DinoLite to analyze them more closely. Students will be able to see the external and possibly the internal structures an insect uses for survival, growth, behavior, and reproduction. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and will experience holding nature's finest.**

STANDARDS	BIO1.LS1, BIO1.LS2, BIO1.LS4, BIO1. ETS2

INTRODUCTION TO PHOTOSYNTHESIS II

Photosynthesis is one of the most important and complex processes in all of biology. However, there are some simple rules and fun interacting games that can help your student understand this chemical reaction. Our Introduction to Photosynthesis program will guide students through the requirements, stages, and chemical equation it takes to make the complex cycle of photosynthesis happen. Students will be able to see first hand the results of photosynthesis all around them here at Lone Oaks Farm.

STANDARDS	HS-LS1-5, HS-LS2

THE SCOOP ON WATER AND SOIL

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STANDARDS	HS-ESS2-5

> “The students were able to take information learned at the farm back to their classroom. They are eager to tell others at their individual schools about their awesome learning experience.

WATER QUALITY THROUGH METAMORPHOSIS

From a young age, we learn that the hungry caterpillar eventually becomes a beautiful butterfly. In water quality through metamorphosis, we investigate this process of change in a variety of insects. Your students will be amazed as they discover the cycle of metamorphosis, for a lot of insects, begins in the pond. Students will gain hands-on experience as they collect a variety of samples from one of Lone Oaks Farm's many ponds using aquatic nets and other instruments. After collecting all their samples, they will identify each insect using a description sheet and make several observations about each insect. Students will be able to take a closer look at some of the insect specimens using our Dino-Lite digital microscope. Students will be able to determine if the pond is considered healthy depending on their findings from the pond water. Students will use a water quality index scorecard to determine water quality classifications. **This program is a hands-on activity meant for students to connect with nature. Students will get dirty and potentially wet while participating in this program. If you do not wish for your students to get wet, please let us know and we can arrange the program to fit your needs.**

STANDARDS	BIO1.LS1, BIO1. LS2, BIO1.ETS2, BIO1.LS4

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STANDARDS	BIO1.LS2.2, AM.D.ID.A.S.5/7, AM.D.CR.B.8/9/10

ANIMAL PRODUCTION PROGRAM

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STANDARDS	BIO1.LS1.1, BIO1.LS3.1-3, BIO1.LS4.1-3 , BIO1.ETS.2

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STANDARDS	PHYS.PS3.7, CHEM1.PS3.1, CHEM1.PS3.2, CHEM1.PS3.4, CHEM1.PS3.8, M1.N.Q.A.1, AM.D.ID.A.S.5/7, AM.D.CR.B.8-10 *This program will address common computation math skills as well. Students will work with fractional parts associated with recipes as well as measurements of solids and liquids.

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STANDARDS	A1.S.ID.C.5, A1.S.ID.C.6, G.MG.A.2, M1.N.Q.A.1, AM.D.ID.A.S.5/7, AM.D.CR.B.8-10

TEAM BUILDING & LEADERSHIP

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STANDARDS	NONE

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STANDARDS	BIO1.LS1, BIO1.LS2, BIO1.LS4, BIO1.ETS.2, A2.S.IC.A.1, M1.N.Q.A.1, AM.D.ID.A.S.5/7, AM.D.CR.B.8/9/10

ELECTRO-SHOCKING USING A SHOCK BOAT

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STANDARDS	BIO1.LS1, BIO1.LS2, BIO1.ETS2, BIO1.LS4

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STANDARDS	BIO1.LS1.1/8/9, BIO1.LS2.1-5, BIO1.LS4.1-3, BIO1.ETS.2, M1.N.Q.A.1, AM.D.ID.A.S.5/7, AM.D.CR.B.8-10

WHY IS RIVER CHANNELIZATION BAD?

Students will get to see education technology in action as they examine the "stream table" to explore how channelization of a river affects erosion of that body of water! This activity includes real life connections as we discuss the channelization of rivers across West Tennessee. Why is river channelization bad? With this program, your students can find out!

STANDARDS	EVSC.ETS3.1, GEO.ESS2.10, GEO.ESS2.11

DELTA FORMATION

In this program, students will use our river stream table to demonstrate the creationof a delta! Students will ask and answer questions such as, "Where did the delta's sediment come from?", "How do changes upstream affect the delta?", and "How do the size of sediment pieces and the speed of the water impact the distance the particles travel downstream?" Students will also get the opportunity to become experimenters by adding items to the stream table and shifting sediment to replicate formations such as seawalls and dikes to see how these man-made items affect the river and delta health.

STANDARDS	EVSC.ESS3.13, EVSC.ETS3.1, GEO.ESS2.10, GEO.ESS2.11

WHY DO RIVERS MEANDER?

In this highly informative and relevant lesson, students will use the river stream table to demonstrate how a river is constantly changing over time. Students can build their own river and then make man-made additions to predict how they will affect the water and soil movement and how the water and soil movement will affect the additions! This is a versatile lesson that includes elements of environmental science, geology, physics, and engineering!

STANDARDS	EVSC.ESS3.13, EVSC.ETS3.1, GEO.ESS2.10, GEO.ESS2.11

HYDROPONICS

Students get to experience the art of growing food hydroponically with this fascinating program. Students will first visit and learn about our aeroponic tower, then they will get to be a part of taking care of its plants! They will even get the opportunity to make their own hydroponic plant pot to take back to school with them!

STANDARDS	CHEM1.PS1.7, EVSC.ETS3.1

HOW GROUND COVER IMPACTS WATER MOVEMENT

Students will have the chance to use the rainfall simulator to compare runoff and groundwater production for different ground covers. They will also be able to become engineers and design improvements for ground cover scenarios to increase infiltration and groundwater production as well as decreasing runoff totals! This program shows the connection between farming practices and water movement.

STANDARDS	EVSC.ESS3.6, EVSC.ESS3.13, EVSC.ETS3.1, GEO.ESS2.10, GEO.ESS3.3

SOIL TEXTURE

In this program, students will learn all about soil texture and how it can indicate how well the soil can hold nutrients and water that plants need to grow! Using soil sieves, students will get to investigate and examine their soil samples. They will then use math to determine the composition of the soil and classify it with a Soil Texture Triangle Chart!

STANDARDS	EVSC.ESS2.1, GEO.ESS2.1, SCRE.ETS2.3, SCRE.ETS3.4, SCRE.ETS3.14, A1.A.CED.A.1

PURE RECREATION

Book a full day of recreational fun here at Lone Oaks Farm or build it into your day as a morning or afternoon activity. Our pure recreation includes kayaks/waterboarding, volleyball/gaga ball, kickball, and other outdoor games.

STANDARDS	NONE

STEM EDUCATION
at LONE OAKS FARM

SCHEDULE CONFIRMATION FORM

*Your date will NOT be considered reserved until your Schedule Confirmation Form and Tax Exemption Form have been received and your requested date verified by Lone Oaks Farm.

Educational Field Trip $10 per student and $10 per non-school employee Recreation Only Field Trip $10 per person	*Lunch available for an additional $10/person. Menu available upon request. Lunch Form & Food allergies must be turned in 2 weeks before field trip. Minimum of 20 to be applicable.*

Name of School: _____

County: _____ Grade Level: _____

Date Requested: _____

Coordinating Teacher: _____

Daytime Phone: _____ Email: _____

Method of Travel: _____

Est. Arrival Time: _____ Est. Departure Time: _____

TOTAL PARTICIPANTS (if unsure, please give an estimation)

Minimum number for educational field trips is 15 paid students. Minimum for recreational field trips is 20 paid people. At this time, we are limiting our groups to 50 or less. This number includes students, teachers, and parents.

Students: Male _____ Female _____

Adults: Male _____ Female _____

Please choose at least 3 programs from those listed in your grade level. Once your date is confirmed, we will contact you to work on customizing the programs and your day.

Special Needs/Allergies: _____

To whom should your invoice be addressed?

Name: _____ Email: _____

Address: _____

_____

LONE OAKS FARM
10,000 Lake Hardeman Rd.
Middleton, TN 38052
(731) 217-7077
www.loneoaksfarm.com

STEM EDUCATION
at LONE OAKS FARM

UTEXTENSION
INSTITUTE OF AGRICULTURE
THE UNIVERSITY OF TENNESSEE

PARTICIPATION LIABILITY AGREEMENT

This form **MUST** be completed by every adult chaperone and teacher that participates in the STEM Education Program at Lone Oaks Farm.

Name of User Group: _____

Date of Event: _____

Name of Chaperone : _____

Phone: _____

Address: _____

_____

I hereby agree to indemnify the University of Tennessee and hold it harmless from all liabilities arising out of my participation in programs at Lone Oaks Farm including but not limited to personal injury, property damage, court costs and attorney fees.

I hereby release the University of Tennessee from any financial responsibility due to sickness or accidents that may occur during or as a result of this activity. I am not participating in this activity as a volunteer with the University of Tennessee, and am therefore not entitled to protection under the Tennessee Claims Commission Act of 1984.

I understand that the University of Tennessee does not provide accident insurance coverage for participants in the STEM program at Lone Oaks Farm. I understand that the University of Tennessee strongly recommends accident insurance coverage be provided by my personal policy or a school policy.

Signature: _____ Date: _____

STEM EDUCATION
at LONE OAKS FARM

FIELD TRIP PERMISSION FORM

Student Name: _____ Date: _____

Address: _____ Home Phone _____

_____ Cell Phone _____

This form must be completed and signed by the parent or legal guardian for each child who participates in the STEM Education program at Lone Oaks Farm.

I _____ give permission for my child _____
(Parent/guardian) (Child's name)

to participate in the STEM Education program at Lone Oaks Farm in Middleton, Tennessee from

_____ to_____ as an extension of his/her classroom curriculum.
(Departure date) (Return date)

ATTN: Following CDC, local government, and university guidelines, Lone Oaks Farm will adhere to all recommended precautions as we prepare for your visit. We take these precautions very seriously and we want you to know the safety and well being of you and your student is a top priority for us. Below you will find our updated policy for visiting Lone Oaks during this time.

- At this time, we are limiting the number of participants to 50 or less in order to maintain social distancing.
- At this time, Hardeman County has not mandated wearing masks. We ask that you follow your school's requirement for masks. If your child is required to wear a mask at school, we ask that you wear one here as well. We will not be able to supply groups with masks so please make sure you come prepared. Our staff will wear a mask during all indoor sessions and activities.
- We will have several sanitizing stations throughout the farm so students and adults can sanitize as needed.
- We will encourage social distancing when indoors and we will split into smaller groups during outside activities.
- At this time, we are asking that all groups bring their own lunches.
- As an added precaution, all surfaces and learning materials at Lone Oaks Farm will be sanitized daily.

I hereby release The University of Tennessee Extension, the local school and school system, their employees and volunteer chaperones from any financial responsibility due to sickness or accidents that may occur during or as a result of this activity. To insure prompt attention in case of serious sickness or accident, I hereby authorize the persons responsible to incur expenses considered necessary and agree to pay for the same, if they are not covered by my insurance policy. Should the need arise, I give permission for my child to be taken to a doctor or hospital for medical treatment. I understand that I am responsible for transporting my child in the case of a medical or discipline problem if the coordinating teacher deems it necessary for my child to return home.

I understand that The University of Tennessee does not provide accident insurance coverage for participants in the STEM Education program at Lone Oaks Farm. I understand that The University of Tennessee strongly recommends accident insurance coverage be provided for my child by my personal policy or a school policy.

Publicity Release As indicated by the signatures on this form, I authorize The University of Tennessee to photograph, film, audio/video tape, record and/or televise their image and voice, and biographical material, in whole or in part in any medium now known or developed in the future, without any restrictions.

Parent/guardian Signature: _____ Date: _____

Please bring completed permission forms on the day of your event