KBS K-12 Partnership 2019 Summer Institute – **TUESDAY**, June 25

Biodiversity Bonanza!

8:00am **Breakfast, Introductions, Announcements** **Auditorium**

8:30am **Plenary Speaker: Dr. Will Wetzel**, Asst. Professor of Entomology
Extreme climate events and the ecology of insects on common milkweed **Auditorium**
@wcwetzel

9:30am Concurrent Session Teasers **Auditorium**

9:45am **Group Picture**

10:00am **Tuesday – Concurrent Session 1**

A. **Involving students in ecological restoration decisions** (Middle & High School) Organizer: John Brittenham (Restoration Ecologist, Blue Heron Ministries)	**Stack Bldg Room 139**
B. **One of the wonders of the microbe world: Nitrogen fixation** (Elementary School) Organizer: Caro Cordova (KBS-GLBRC Postdoctoral Research Associate) @CaroCordovaEC	**Stack Bldg Room 140**
C. **S'mores and More!**** (Elementary School) Organizer: Sara Syswerda (Education Director, Pierce Cedar Creek Institute) @PierceInstitute ** This session continues in Concurrent Session 2	**Auditorium**

11:00am **Break**

11:15am **Tuesday – Concurrent Session 2**

A. **Biodiversity right at your feet: plant diversity sampling and comparison** (Middle School) Organizer: Mitch Lettow (Stewardship Specialist, SW Michigan Land Conservancy) @SWMLC	**Stack Bldg Room 139**
B. **Sensational seeds: adaptations, dispersal and predation** (All Ages) Organizers: Meredith Zettlemoyer (KBS Graduate Student, Plant Biology) & Sarah Johnson (KBS Independent Study Undergraduate) @mazettlemoyer	**Stack Bldg Room 140**
C. **The amazing architecture of clonal plants!** (All Ages) Organizer: Mike Ryskamp (MSU Graduate Student, Plant Biology)	**Stack Bldg Room 141**
D. **S'mores and More!**** (Elementary School) Organizer: Sara Syswerda (Education Director, Pierce Cedar Creek Institute) @Pierce Institute ** This session continues from Concurrent Session 1	**Auditorium**

12:30pm **Lunch** **McCrary Dining Hall**

1:15pm **Tuesday – Concurrent Session 3**

A. **Dendrology Scavenger Hunt** (High School) Organizer: Katie Minnix (MSU Graduate Student, Department of Forestry)	**Stack Bldg Room 139**
B. **Fostering Wonder through Project-Based Science** (Grades 3-5) Organizers: Chris Reimann & Angela Kolonich (CREATE for STEM Institute at MSU) @create4stem	**Stack Bldg Room 140**
C. **How to bee a pollen detective** (Middle & High School) Organizer: Sean Griffin (KBS Graduate Student, Integrative Biology) @larval_yeti	**Stack Bldg Room 141**

2:15pm **Break**

2:30pm **Tuesday – Concurrent Session 4**

A. **Where the wild things aren't: using eDNA to find rare species** (High School) Organizer: Kyle Jaynes (KBS Graduate Student, Integrative Biology) @KE_Jaynes	**Stack Bldg Room 139**
B. **What's Your "Q" - Water Quality Activities** (Middle & High School) Organizer: Cheryl Hatch (High School Teacher, KAMSC) & Meredith Zettlemoyer (MSU Graduate Student, Plant Biology) @mazettlemoyer	**Stack Bldg Room 140**
C. **Bugs in your backyard** (High School) Organizer: Kayleigh Hauri (MSU Graduate Student, Entomology)	**Stack Bldg Room 141**

3:30pm **Connecting Sessions to NGSS for Classroom Implementation** **Auditorium**
Organizer: Kara Haas and Thomas Charney
@KaraHaasSciEd

4:00pm **Evaluation & Adjourn** **Auditorium**

Your feedback helps us improve our programming for you. Please take a moment to complete this online evaluation form.

Link to today's online evaluation form: June 25 Evaluation

https://bit.ly/2WSLDmQ

KBS K-12 Partnership 2019 Summer Institute – **WEDNESDAY**, June 26

Biodiversity Bonanza!

8:00am **Breakfast, Introductions, Announcements** **Auditorium**

8:30am **Plenary Speaker:** Dr. Mariah Meek, Asst. Professor of Integrative Biology **Auditorium**
Genomics to the rescue: improving conservation of imperiled fish populations
@mhmeek

9:30am **Concurrent Session Teasers**

9:45am **Ice Breaker**

10:00am **Wednesday – Admin and Teacher Roundtable** **Auditorium**

Organizers: Misty Klotz, KBS Community Outreach Assistant and Kara Haas, KBS Science Education & Outreach Coordinator, @KaraHaasSciEd; #kbsk12

Please help shape the direction of the K-12 Partnership, share your school's needs for science education so we can create a plan to leverage the resources at KBS to serve district goals and improve science education for all learners.

We'll work together to answer these questions:

- *What are the science education needs and goals in our school?*
- *What solutions and bridge building is needed to reach science education needs and goals for your school?*
- *What role can KBS play in building bridges?*

Facilitated discussion groups to identify needs of school districts and goals for the KBS K-12 Partnership moving forward.

Introduction, Ground Rules, 'Bike Rack'

Bridge Building: What is does the WOW future of science education? Where is science education NOW and HOW do we build bridges to WOW?

11:00 a.m. **Break**

11:15 a.m. **Sticky Dot Voting**: We'll use this process to determine the priority areas for future work

12:00pm **Group Picture** **Behind the Manor House**

12:15pm **Lunch** **McCrary Dining Hall**

1:15pm **Wednesday – Concurrent Session 5**

A. **Chromebooks and Probeware** (High School) Organizer: Connie High (Delton Kellogg High School Teacher) #glcs	**Stack Bldg Room 139**
B. **Birds of a Feather Flock Together!** (Grades 4-6) Organizer: Dorothy McLeer (Program Coordinator and Interpretive Naturalist, University of Michigan - Dearborn Environmental Interpretive Center) @UM_Dearborn	**Stack Bldg Room 140**
C. **3-D or not 3-D, that is the question!!!** (Elementary & Middle School) Organizer: Marti Beitner-Miller (MSU Instructor, Teacher Education)	**Stack Bldg Room 141**

2:15pm **Break**

2:30pm **Wednesday – Concurrent Session 6**

A. **Bee Friendly Classrooms & Other Pollinators - How can your class make an impact?** (Grades 3-8) Organizer: Veronica Bolhuis (4-H Program Coordinator, MSU Extension) @MSUExtension @4H	**Stack Bldg Room 139**
B. **Sensational seeds: adaptations, dispersal and predation** (All Ages) Organizers: Meredith Zettlemoyer (KBS Graduate Student, Plant Biology) & Sarah Johnson (KBS Independent Study Undergraduate) @mazettlemoyer	**Stack Bldg Room 140**
C. **Hiding in plain sight: adaptations for survival** (Middle School) Organizer: Ava Garrison (KBS Graduate Student, Plant Biology) @Rad_ishLady	**Stack Bldg Room 141**

3:30pm **Connecting Sessions to NGSS for Classroom Implementation** **Auditorium**
Organizer: Kara Haas and Thomas Charney
@KaraHaasSciEd

4:00pm **Evaluation & Adjourn** **Auditorium**

Your feedback helps us improve our programming for you. Please take a moment to complete this online evaluation form.

Link to today's online evaluation form: June 26 Evaluation

https://bit.ly/2QLCXch

KBS K-12 Partnership 2019 Summer Institute – **THURSDAY**, June 27

Biodiversity Bonanza!

Biodiversity Field Day

8:00am **Breakfast, Introductions, Announcements** **Auditorium**

8:30am **Plenary Speaker: Dr. Rebecca Jordan** Department of Community Sustainability **Auditorium**
Learning about Systems, Models, and Biodiversity: Considerations for Planning

Thursday – Activity 1 **10:00am – 3:00pm**

10:00am	**Vernal Pool Classroom**	**Stack Bldg Room 140**
	Organizer: Michigan Natural Features Inventory (MNFI) @MichiganNFI	
12:00pm	**Carpool to Pierce Cedar Creek Institute**	**Upper Parking Lot**
	Pickup and distribute boxed lunches	
12:30pm	**Field portion of vernal pools**	**Pierce Cedar Creek Institute**
	Organizer: MNFI @MichiganNFI @PierceInstitute	

Thursday – Activity 2 **10:00am – 3:00pm**

10:00am	**BioBlitz - A schoolyard species inventory event (lessons)**	**Stack Bldg Room 141**
Organizer: Gabrielle Likavec (Michigan Geographic Alliance Director, Central Michigan University)		
12:15pm	**Lunch**	**McCrary Dining Hall**
1:15pm	**BioBlitz - A schoolyard species inventory event**	**Location: OUTSIDE**

3:15pm **Snack**

3:30pm **Connecting Sessions to NGSS for Classroom Implementation** **Auditorium**
Organizers: Kara Haas and Thomas Charney

4:00pm **Evaluation & Adjourn** **Auditorium**

Link to today's online evaluation form: June 27 Evaluation
https://bit.ly/2wC71Of

KBS W.K. Kellogg Biological Station

KBS LTER Kellogg Biological Station Long-term Ecological Research

Session Descriptions – Tuesday, June 25, 2019

Involving students in ecological restoration decisions Middle School

Organizer: John Brittenham

Abstract: This session will discuss ideas on how to include students in ecological restoration projects in and around school grounds from the perspective of a restoration ecologist. Potential project ideas and how to incorporate the projects in the classroom will be covered.

One of the wonders of the microbe world: Nitrogen fixation Elementary School

Organizer: Caro Cordova (KBS-GLBRC Postdoctoral Research Associate)

Abstract: Did you know that 78% of the air that we breathe is nitrogen (N_2)? Did you also know that the most limiting nutrient in terrestrial plants is nitrogen? Weird, right? Come join me to dive deep into this subject and learn more about nitrogen in agroecosystems, especially how some plants have the advantage to associate with nitrogen fixing bacteria to obtain their nitrogen from the air.

S'mores and More! Elementary School

Organizer: Sara Syswerda (Education Director, Pierce Cedar Creek Institute)

Abstract: This session, geared towards elementary teachers, will focus on helping teachers learn how to construct engineering problems to address Michigan Science Standards. We will be building solar ovens to help us learn about energy transformations, temperature measurement, and engineering practices. Be prepared to work hard to cook your s'more, and the most melted s'more wins!

Biodiversity right at your feet: Plant diversity sampling and comparison Middle School

Organizer: Mitch Lettow (Stewardship Specialist, SW Michigan Land Conservancy)

Abstract: The Southwest Michigan Land Conservancy has dozens of preserves throughout the region, which can be perfect for outdoor classrooms. We'll discuss the conservancy, opportunities to use the preserves for classes, and talk about biodiversity (specifically plants) along with a simple activity to promote discussion, critical thinking, and habitat comparisons among students.

Seed adaptations: dispersal and predation! All Ages

Organizers: Sarah Johnson (KBS Independent Study Undergraduate) & Meredith Zettlemoyer (KBS Graduate Student, Plant Biology)

Abstract: How do seeds get around? In this inquiry-based lesson, we will observe and collect data on seed adaptations and the many unique ways seeds disperse. We will also investigate how seed predators affect seed populations by learning how to set up a seed predation study in the schoolyard.

The amazing architecture of clonal plants! All Ages

Organizer: Mike Ryskamp (MSU Graduate Student, Plant Biology)

Abstract: We will discuss how the architecture of clonal plants is adaptive in variable, stressful environments. We will dig up some common clonal species to investigate their below-ground architecture, and we will review age-appropriate ways to evaluate and quantify clonal architecture for your students.

Dendrology Scavenger Hunt High School

Organizer: Katie Minnix (MSU Graduate Student, Department of Forestry)

Abstract: In this activity, participants will practice identifying leaf characteristics and some tree species during an outdoor scavenger hunt.

Fostering Wonder through Project-Based Science Grades 3-5

Organizers: Chris Reimann & Angela Kolonich (CREATE for STEM Institute at MSU)

Abstract: For elementary teachers, the new Michigan Science Standards represent both a challenge and an opportunity. Come see how well-designed science curricula can also support student growth in literacy and mathematics by tapping into a powerful classroom resource: each student's ability to wonder.

How to bee a pollen detective Middle & High School

Organizer: Sean Griffin (KBS Graduate Student, Integrative Biology)

Abstract: What makes a bee a good pollinator? Do bees always pollinate the flowers they visit? How can flowers make bees do what they need? In this session we will talk about pollination and plant competition, and will create pollen slides to unravel the mysteries of bee behavior.

Bugs in your backyard High School

Organizer: Kayleigh Hauri (MSU Graduate Student, Entomology)

Abstract: What bugs are in your backyard, and what is their role in the ecosystem? Learn what traits distinguish insect herbivores, predators, and parasitoids, how they interact with plants and each other, and how to identify bugs from your own garden or yard.

What's your "Q"? - Middle and High School
Water Quality Activities for Middle and High School Classrooms

Organizer: Cheryl Hatch (High School Teacher, KAMSC) & Meredith Zettlemoyer (KBS Graduate Student, Plant Biology)

Abstract: Cheryl and friends will review and provide hands-on practice of the components needed to calculate a water quality index for a body of freshwater. Using physical and chemical tests and examination of freshwater invertebrates collected from leafpacks, students and teachers can draw a complete picture of the health of nearby bodies of water. Join us for practice and conversation about this important topic!

Where the wild things aren't: Using eDNA to find rare species High School

Organizer: Kyle Jaynes (KBS Graduate Student, Integrative Biology)

Abstract: Environmental DNA (eDNA) is DNA shed by organisms in their environment, which can be sampled to test for the presence of rare species that may be difficult to find. This talk will explore these methods with a focus on hypothesis-driven classroom based activities for both using eDNA techniques and analyzing example datasets.

Session Descriptions - Wednesday, June 26, 2019

Using Colorimeter Probes and Chromebooks to Analyze Absorption Data High School

Organizer: Connie High (Delton Kellogg High School Teacher)

Abstract: Are you asked to use more technology in the classroom? Do you want to analyze data? This inquiry activity will get the ball rolling on talking about absorbance spectrums in a way that is engaging and simple to follow.

Birds of a Feather Flock Together! Grades 4-6

Organizer: Dorothy McLeer (Program Coordinator and Interpretive Naturalist)

Abstract: There is a tremendous diversity of birdlife on Earth: 10,000 species of birds (that we know of) in the world; 993 in North America; and 450 in Michigan alone! By training your observational powers of physical and behavioral adaptations on a broad scale, then progress to more subtle observations, you'll figure out the basic bird groups. We'll practice by creating our own "field ID key" before going outdoors….

3-D or not 3-D, that is the question!!! Elementary & Middle School

Organizer: Marti Beitner-Miller (MSU Instructor, Teacher Education)

Abstract: Does your school district have a science curriculum that provides lab experiences with formative assessments for your students to complete? Do you have no science curriculum to follow and you design your own lab experiences? Do you have a favorite lab experience that you have been doing for years, but want to be sure it fits into the new Next Generation Science Standards? If your answer was "yes" to any or all of these questions, this session is for you!!! Through participation in simulation experiences, we will practice and examine how to be sure that the formative assessments being used for your students are meeting the 3-D's for the NGSS Performance Expectations!!!

Bee-Friendly Classrooms & Other Pollinators - How can your class make an impact? Grades 3-8

Organizer: Veronica Bolhuis (4-H Program Coordinator, MSU Extension)

Abstract: We'll talk about what pollinators are, their impact on our food system and how we can help to support them through pollinator gardens and native bee houses.

Seed adaptations: dispersal and predation! All Ages

Organizers: Sarah Johnson (KBS Independent Study Undergraduate) & Meredith Zettlemoyer (KBS Graduate Student, Plant Biology)

Abstract: How do seeds get around? In this inquiry-based lesson, we will observe and collect data on seed adaptations and the many unique ways seeds disperse. We will also investigate how seed predators affect seed populations by learning how to set up a seed predation study in the schoolyard.

Hiding in plain sight: adaptations for survival Middle School

Organizer: Ava Garrison (KBS Graduate Student, Plant Biology)

Abstract: In a short lecture, students will learn about how animals and plants use camouflage to avoid predation and herbivory, and how those adaptations can affect populations. An activity following the lecture will allow students to simulate the role of camouflage in predation and population dynamics.

Session Descriptions - Biodiversity Field Day - Thursday, June 27, 2019

Field Day Option

Vernal Pool Monitoring Workshop Grade levels: 5-12

Organizers: Daria Hyde, Phyllis Higman, and Yu Man Lee, Michigan Natural Features Inventory, Michigan State University

Our vernal pools workshop will start in the classroom where educators from the Michigan Natural Features Inventory will give what, when, where, why of vernal pools—what are they, when and where do they occur, and why should we care about them? They will also tell us how we can find them and what critters we can expect to find in them! In the afternoon we will head out to a vernal pool to put our knowledge in action! We will sample the pool to look for macroinvertebrates and amphibians present (including indicator species like fairy shrimp!), and learn how we can participate in the Vernal Pool Patrol, a statewide citizen science-based vernal pool mapping and monitoring program. By the end of the day you will have all the tools you need to feel confident teaching about vernal pools yourself!

BioBlitz - A schoolyard species inventory event Grade levels: K-12

Organizer: Gabrielle Likavec, Michigan Geographic Alliance Director, Central Michigan University

Using the free lessons developed by the Michigan Geographic Alliance, we'll start by participating in some structured BioBlitz activities (inc. plot/grid observations, scavenger hunts, etc.). For the afternoon we'll head outside to do some Blitzing! We'll do a broad survey of many different groups of organisms, practicing survey techniques and using identification tools such as apps and field guides. We will conclude the experience with a wrap up of species observed (iNaturalist) and creating plans for bringing the experience to students. At the end of the day participants will also have taken the first step in the journey towards becoming National Geographic Certified Educators.