Agenda
Day 1 – Wednesday, August 17, 2016

8:00am Breakfast, Introductions, and Announcements - Auditorium

8:30am Speaker: Sara Tanis, "What's Under the Bark: Forest Insect Research" - Auditorium

Sara Tanis, post-doctoral researcher, Michigan State University, Department of Entomology (Emerald Ash Borer youtube)

Michigan is at exceptional risk for the introduction of invasive forest insects because it 1) has extensive forest resources, 2) serves as a major manufacturing center, and 3) receives a variety of commodities from around the world including nursery plants and wood products. The primary objective of this research is to survey sites that may be at relatively high risk of exotic forest pest introduction and establishment. Early detection of potentially damaging exotic forest pests can facilitate efforts to eradicate, contain, or manage populations of potentially invasive organisms.

9:30am Michigan Environmental Education Curriculum Supplement Training Session Teasers (MEECS Facilitators) – Auditorium

10:00 Michigan Environmental Education Curriculum Supplement: Climate Change for Grades 7-9 - facilitator: Amanda Syers - **Auditorium** Amanda Syers works at Grand Valley State University in the College of Education on the MEECS Online project. Amanda has experience as a classroom teacher, having taught 6th grade science in North Carolina and adult and alternative education at White Lake Area Community Education. She also has worked as a non-formal educator at the GVSU Annis Water Resources Institute. She is the co-author of the MEECS Climate Change Unit.

MEECS Climate Science Unit provides teachers with a relatively compact overview of climate science, emphasizing data relative to Michigan and the Great Lakes. The lesson sequence begins with distinguishing between weather, climate, and climate variability. Students then gain a basic understanding of the natural mechanisms of climate change through hands on activities of the Earth's energy balance, the greenhouse effect, and the carbon cycle (sources and sinks).. Climate Science includes the following lessons: what is climate?; earth's energy balance; greenhouse effect, climate models, carbon cycle, climate forces and uncertainty, and evidence of change. MEECS is a program of the Michigan Department of Environmental Quality

KBS K-12 Partnership Summer Institute 2016 – Invasion!

10:00 Michigan Environmental Education Curriculum Supplement Ecosystems & Biodiversity Grades 5-6 - facilitator: Patty Tolly, Co-facilitator Misty Klotz– **Terrace Room**
Patricia Tolly has been a teacher in the Forest Hills School District, in Ada, Michigan for the past 21 years. During this time she has taught students in grades 3-8 in all subject areas. She is currently teaching 6th grade science, math and reading at Central Woodlands 5/6 School. Five years ago, she added place-based environmental education through Groundswell to her classroom and with that came her interest in the MEECS program.

MEECS Ecosystems & Biodiversity Unit uses a Michigan context to provide students with a solid foundation in understanding basic ecological principles, as well as the importance of biodiversity as it relates to Michigan's environment, economy, and society. Key concepts include: Habitat levels; biome, community, population, ecosystems, organisms. MEECS is a program of the Michigan Department of Environmental Quality

11:00am Break

11:15 Return to your MEECS training session

12:30pm Lunch at McCrary Dining Hall

1:30pm MEECS Climate Change for Grades 7-9 - Auditorium
Part 2: Climate Impacts on Michigan and the Great Lakes begins where Climate Science ends, with a review of the indicators of climate change, and then focuses on the potential impacts of changes in Michigan. Three lessons focus on the social science perspective and on the decisions which might confront citizens of Michigan in the future. The lessons are Climate Change Indicators; Plant and Animal Phenology; Ecosystem Relationships; What Can I do?; Community Conversations and Climate Change in the News.

1:30pm - 3:00 MEECS Ecosystems & Biodiversity Grades 5-6 – Terrace Room
Biodiversity lessons include scientific investigation, data-based decision making and reviewing factors that threaten biodiversity.

3:00 - 3:15 Practice a MEECS lesson to present to the other MEECS session participants.

3:15- 3:30 Break - Auditorium

3:30 - 4:00 participants share a MEECS lesson with their peers - Auditorium

3:50 - 4:00pm Evaluation and Adjourn

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Day 2 – Thursday, August 18, 2016

8:00am Breakfast, Introductions, Announcements - Auditorium

8:30am Speaker: Sarah Nelson, Barry County Conservation District, "Helping Citizen Scientists Battle Invasive Species" – Auditorium

Sarah Nelson, Executive Director, Barry Conservation District

Invasive species are a threat to our economy, ecosystems, and even human health. New species are regularly arriving in Michigan, threatening local aquatic and terrestrial systems. Thanks to the Michigan Invasive Species Grant Program, local organizations have the opportunity to come together to strategically prevent new infestations and manage existing populations of invasive species. Join Sarah Nelson as she explains these efforts and why it is so important for all local residents to get involved.

9:30am Concurrent Session Teasers - Auditorium

10:00am Concurrent Session 1 (2 hours Sessions)

A. **Algae in the Classroom – Jake Nalley (K-12 Partnership Fellow) and Connie High (Delton Kellogg) – Classroom 138**

Algae just might be the answer to a number of the pressing sustainability concerns we face. Bringing algae into the classroom with this "drop in ready" kit offers students the opportunity to be phycologists! Students will cultivate their own algae, monitor its growth and discover the many reasons algae could be feed, food, fertilizer and fuel! Kits will be provided without charge by the Algae Foundation.

B. **Data Nuggets in the Classroom - Little Nuggets Can Do Great Things! - Cheryl Hach (Kalamazoo Area Math & Science Center) and Marcia Angle (Lawton) - Auditorium**

In our session we will talk about the scientific principles of investigation, student talk moves and unveil our new graphic organizer that we promise will better support your students when it comes to Claim, Evidence and the oh so difficult Reasoning portions of science writing. This session is for Upper elementary, middle and high school teachers whose students struggle with quantitative skills and CER writing. Our little nuggets can do great things!

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C. **Agricultural Education at KBS* – Chris Anderson (KBS Teacher Liaison 2016) - Terrace Room**

The Kellogg Biological Station has world renowned research on row crop and animal agriculture, both of which focus on the ecology and sustainability of the ecosystem. In this session you will get an overview of agricultural research at KBS and the existing resources for K-12 students and teachers. You will participate in a hands on soil and transpiration activity that K-5 students engage in on the Agriculture and Ecology Student Activity trail. And then we will pick your brains to generate ideas to make more connections between teachers and the agriculture science and research at KBS. This work will help create a 5 year plan for K-12 agriculture-themed education at KBS. *elementary appropriate

12:00pm Group photo behind the Manor House

12:15pm Lunch at McCrary Dining Hall

1:30 Concurrent session 2 (1 Hour Sessions)

A. **Classroom Management Strategies – Nanette Clatterbuck (Lake Michigan Academy)- Auditorium**
Classroom management is a challenging task. How can teachers manage a classroom of students with differing abilities and attentiveness? This session aims to offer techniques and skills that will aid teachers in managing highly functional classes that meet a range of student needs.

B. **What question can I investigate? – Misty Klotz (KBS Outreach Educator) and Heather Kittredge (KBS K-12 Fellow) - Terrace Room**
Discover Pacific Education Institute's guide on Field Investigations: Using Outdoor Environments to Foster Students Learning of the Scientific Practices Join Misty and new K12 Fellow Heather Kittredge to create your own field investigation question.

C. **Michigan's Most Unwanted – Dustin Kincaid (KBS K-12 Fellow) - Classroom 138**
How do we identify invasive species, and why do we care? In this lesson, students learn to make and use dichotomous keys to identify common invasive species. Students will gain an appreciation for why invasive species are important through a series of discussions, videos, and keying activities. A graphing activity will allow students to make graphs, interpret data from graphs, and draw conclusions based on data.

2:30 Concurrent session 3 (1 hour sessions)

A. **The GLOBE Observer App - Citizen Science in partnership with NASA, Todd Ellis, Western Michigan University, Assistant Professor, Mallinson Institute for Science Education and Department of Geography - Auditorium**

In this session, we will explore using the GLOBE Observer App, a new citizen science app produced by NASA in conjunction with the GLOBE Program (http://www.globe.gov). The app lets you take cloud observations anytime using your smartphone when NASA Satellites are overhead, and then later sends you images of what the clouds you saw look like from space. All the observations are then available as part of the GLOBE program for use in student research.

B. **Cooperative Invasive Species Management Areas - Citizen Science to combat invasive species - Michael Anderson (Citizen Science Intern, Kalamazoo Nature Center) - Classroom 139**

Tools and techniques for participating in citizen science invasive species monitoring/reporting.

C. **What lives in the schoolyard?* – Kara Haas (KBS Science Education and Outreach Coordinator) and Renee Bayer (CREATE for Stem Institute, MSU) – Terrace Room**

Michigan Science Standard focused investigations for K-5 that help students find design and carry out investigations and gather data to answer to the driving question, “what lives in my schoolyard?” *elementary appropriate

3:30pm Break & Snacks – Auditorium

4:00pm Evaluation and Adjourn

Day 3 – Friday, August 19, 2016

8:00am Breakfast, Introductions, and Announcements - Auditorium

8:30am Speaker: Phyllis Higman, "Tales from the Front: Battling Invasive Species with Place-based Education" – Auditorium

Phyllis Higman, Senior Conservation Specialist and Conservation Education Lead at Michigan Natural Features Inventory (MNFI)

I will build upon Thursday's plenary talk and discuss invasive species in the context of biodiversity conservation and a strategic framework for determining action. I will feature key species of concern in southern Michigan and include a discussion of what you should know before you try to control a species. Finally, I will share some examples and ideas for activities you could engage your classes in.

9:30am Concurrent Session Teasers AND Choose carpool groups for field trips - Auditorium

10:00am Concurrent Session 1

A. **Papermaking with Invasive Plants – Jane Kramer – Fine Art Photographer, KBS Visiting Artist 2016 - Classroom 138**

Jane Kramer is a local artist who specializes in photographing the shadows of extremely rare native plant species and then prints these photos on paper made from invasive species biomass. Teachers will be presented with the art of making paper from plant biomass while highlighting the importance of fostering native plant diversity.

B. **A Focus on Wildlife: a Zooniverse Citizen Science Project - Remington Moll - Auditorium**

MSU recently launched Focus on Wildlife, an ecological research project that studies the secret lives of urban wildlife using camera traps. Focus on Wildlife is supported by Zooniverse, a website that enables any interested citizen, from elementary kids to retirees, to participate directly in the scientific process. The session will offer ideas about how this project might be used to teach the scientific method. We will also review images captured by a camera trap deployed at KBS the day prior to the session.

11:00am Break (Auditorium)

11:15-12:15 Concurrent Session 2

A. Torrey Wenger (Bloomingdale) and Marty Buehler (Hastings), 2016 Schemske Lab RETs: "Winter is coming! Are you adapted? A Next Generation-linked study in plant adaptation" – Classroom 139

Explore adaptations using a plant genetics workhorse, Arabidopsis thaliana. Do A. thaliana plants from different parts of the plant's extensive range react the same to changing conditions? Grow your own plants and design your own studies, starting with this NGSS-ready lesson plan. The Schemske lab will provide kits; a report of results and suggested improvements is required.

B. "Prairie Life Ain't Easy, When It Never Rains" - Shaun Davis (Thornapple Kellogg), Jodie McManus (Parchment), 2016 Lau Lab RETs - Classroom 140

Join us as we take a look at some ways to refurbish your BEST Plots (or any other available space you may have). Based on research that was done at KBS this summer, we'll examine using 1) open top chambers to investigate the effects of increased temperature on native plants, 2) litter bags to study decomposition in heated and nitrogen-rich environments, 3) goldenrod plants to examine parasitism (galls) and its candy-cane morph, and 4) a lesson to explore how elevated heating affected the partridge pea/ants/flowers/rhizobia relationships.

C. Jennifer Boyle (Gull Lake), 2016 Lau Lab RET - "What's eating the seeds? Puny Predators in the Prairie"* - Terrace Room

Walk to visit the prairie restoration plots and get an overview of the diverse research projects taking place. Then return to the classroom to put together your own grainivore trays for schoolyard investigations. Jen has a lesson plans for studying seed eaters, you will get a copy of the lessons. *elementary

12:30pm Lunch* at McCrary Dining Hall

1:30 Off-site Learning Opportunities – 1 hour each

A. **Birding 101 - At the Bird Sanctuary** – **Misty Klotz** - Participants will go to the Bird Sanctuary to learn how to use binoculars for looking closer at birds. A journaling activity will be practiced that helps turn the focus on the structure and function of beaks and feet in waterfowl and bird of prey species.

B. **Pond Lab Tour – Sara Garnett –** The KBS Pond Labs have contributed a lot of amazing research that has advanced the field of ecology. This session will focus on introducing teachers to the Pond Lab and will cover past and current research at the site.

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3:30pm Break & Snacks - Auditorium

3:45pm What's next for the KBS K-12 Partnership?

4:00pm Evaluation and Adjourn