MSTA 18
Invade Your Parks… and Back Again!
Students Make a Difference With Interdisciplinary STEM!

Christine Kelly
Allendale Middle School

kellychr@apsfalcons.net

Eastmanville Bayou....
Ottawa County Parks Partner with Allendale MS

I.   How We Started Off...
A.   Ottawa County Parks made contact with our English / Language Arts Teacher
B.   Ottawa Co Parks: looking for volunteers and a partner for the parks
C.   LA Teacher-looking for a research paper - lead topic
D.   Ottawa County Parks - Melanie Manion -Natural Resources Management Supervisor
E.   Task: collaborate, develop an Integrated Unit: Science, Art, English

II.   The Parks: Contact and Guidance
A.   The Parks Dept. Provide an Outside Opportunities!
B.   Organize Field Trip
C.   Provide Volunteers to Work With Us
D.   Service - Based Learning
E.   Students learn From Park Reps and Volunteers
F.   In Return, AMS 7th Grade Partners to Volunteer With Ottawa Co. Parks Guidance & We Adopt a Park!

III.   Invasive Species - Theme for Our Partnership
A.   Phase 1: Language Arts Research Paper
   1. Students select an invasive species from list (MI Invasives, Midwest Invasives)
      http://www.misin.msu.edu/
   2. Guidelines and Expectations- students follow a rubric to be consistent and meet their writing goals
B.   MISIN=
   1. A regional effort, develops and provides detection and response resources for invasive species.
2. Goal: assist experts and citizen scientists in the detection and identification of invasive species in support of successful management.

C. AMS 7th Grade Class and Staff Partners to Volunteer with Ottawa Co Parks-----> we adopt a park!

D. Phase 2: Fall Invasives Field Trip #1

1. The students observe goats: management prescribed browsing
2. Students also identify and clear specific invasive species
3. Ottawa County Parks System is a leader in the state and nation in this experimental method of invasive species management
   a. Students learn about this method
   b. Students observe science experiment in real-world application

4. Goats for Hire!
   a. Goats are also “employed” in Ann Arbor and in Oakland County
   b. Ottawa Co. has completed a 3-Year Experiment
   c. Prescribed Browsing Project
      Removing Oriental bittersweet and honeysuckle.
      https://youtu.be/qXgwhx4QWjY
   d. Students can see the “Before” and “After”

5. Wheels to Woods:
   a. Funds to PreK-12 schools (& other youth programs) to pay for transportation costs for an educational field trip to a nearby forest or forest products company.
   b. Wheels to Woods reimburses up to $350 per bus and $1,000 per school.
   c. Applications can be submitted to:
      https://www.treefarmsystem.org/wheels-to-woods

6. Positive Study of Graphs and Charts
   a. *SEPs: Construct, analyze, interpret graphical displays of data
   b. *Distinguish between causal and correlational relationships in data
   c. *Analyze and interpret Data to provide evidence for phenomena
   d. Public Awareness of Invasive Species vs. Control and Reaction
   e. E.D.R.R. Early Detection, Rapid Response
   f. Aquatic Invasive Species Spread Prevention
IV. Phase 3: Invasive Species Presentation
   A. Students Create Posters
      1. Maps of Areas/Infestation
      2. Pictures, Diagrams of Plant or Animal
   B. Brochures to Educate General Public
      1. Problems associated with Invasive Species
      2. How Can People Help?
   C. "Most Wanted” Invasive Species Posters
      1. MEECS Ecosystems Unit
      2. Students Choose a New Invasive Species to Investigate
         MEECS Ecosystems and Biodiversity Unit:
         "Most Unwanted: Invaders of the Great Lakes Region – Students learn about invasive species associated with Michigan and/or the Great Lakes, the problems they present, how they were introduced, and how to prevent their spread in the future."
      3. Students May Choose to Create Online Posters or an Actual Drawing
      4. Students Are Given Clear Guidelines / Rubric

V. Phase 5: Spring Trip- Service Learning and Optional Activities
   A. 2017 Garlic Mustard Pull
      Groups of students clear Garlic Mustard to make room for MI Native Species
   B. Movie Makers
      1. Students create movies to illustrate connections to our parks
      2. Movies help to educate our community about invasives
      3. Students use technology, encourage students’ creative talents
   C. Soil Testing
      1. Soil sampling for data analysis and comparison
      2. Students establish a baseline to compare soil with invasives: soil cleared of invasives -- with Natives
      3. Is the chemical makeup of the soil near Garlic Mustard different than near native plants?
      4. Allelopathy= the release of chemicals that hinder the growth of other plant species
      5. 3. Tea Science Soil Lesson
         Soil Lessons: Soil Science Society America….
      6. Ask the students how they can modify the lesson to match the Invasive Species studies!
D. Letter Writing - Student Activists!
   1. Students choose to write letters to local florists, greenhouses, aquarium supply stores about selling invasives
   2. Students choose to write to a local government official or newspaper ~highlighting the Invasives we are clearing

E. Mapping of Invasives Species- Field Studies
   1. Graphing of Invasives vs Native Species
   2. Students identify common native species and list these by approximate # present
   3. Students note # of Invasives present
   4. Line graphs and data tables document how an area has changed

Mapping of Invasives Species- Ottawa County Parks
   5. Mapping of Invasives:
      Technology GPS, GIS
      Provide accurate treatment
      Ottawa Co. App MIIVS
   6. Ottawa County can track treatments
      (goats, herbicide, temperature, adaptive management)

VI. Additional Possible Student Service / Project / Experiments / Actions

   A. *Partnership With Others (college students, community,...)
   B. *Planting Native Species
   C. *Landscaping Designers
   D. *Develop Pollinator Gardens
   E. *Collect Native Seeds

VII. How Will you Drive This Unit WiTH STEM and NGSS?
    A. Students develop their research with questioning the natural phenomena
       What do you think?
       What do you know?
    B. Before the field trip- ask the students which problems they would like to solve concerning Invasive Species
    C. MISGP: Michigan Invasives Species Grant Program
       Apply For an Outreach Stipend:
       --Lesson Plans
       --Present at Conferences Follow 5E Model
D. Performance Standards:
   Science and Engineering Practices,
   Crosscutting Concepts,
   and Disciplinary Core Ideas

**Essential Questions and Performance Standards**

How do some invasive species negatively impact our native species and the land plants we depend on?
Which experiments and tests could you design to address and solve these problems? Think about the numbers of native and numbers of invasive species you saw (or you will see) in our walk.

**REFERENCES**

1. Ottawa County Parks & Recreation [https://www.miottawa.org/Parks/invasive_species.htm](https://www.miottawa.org/Parks/invasive_species.htm)


3. Project Learning Tree [https://www.plt.org/](https://www.plt.org/)


6 Michigan Alliance for Environmental and Outdoor Education [http://www.maeoe.com/home.html](http://www.maeoe.com/home.html)

7 MEECS: Department of Environmental Education: Michigan Environmental Education Curriculum Support [http://www.michigan.gov/deq/0,1607,7-135-3307_3580_29678---,00.html](http://www.michigan.gov/deq/0,1607,7-135-3307_3580_29678---,00.html)

9 The Nature Conservancy - Invasive Species
http://www.nature.org/search/index.htm?site=prod_nature_org&client=NatureOrg&ie=UTF-8&oe=UTF-8&output=xml_no_dtd&ud=1&entqr=0&q=Invasive+Species#gsc.tab=0&gsc.q=Invasive%20Species&gsc.page=1

10 West Michigan Conservation Network, MSU
http://www.michiganinvasives.org/westmichigancisma/

11 Midwest Invasive Species Network:

12 Minnesota Sea Grant
http://www.seagrant.umn.edu/ais/

13 Ottawa County Parks & Recreation: Managing Invasive Species
https://www.miottawa.org/Parks/invasive_species.htm

14 CKelly Invasive Species Lists - MI, Midwest
https://docs.google.com/document/d/1zr_UuzukLuNjUb1qBdODoDjfXtvqDNxqhQwLf8TOQ/edit
https://docs.google.com/spreadsheets/d/1JqlAgxlhQtb7pXZrejijy5OX28OPsDljg9XZ03ielzQ1l/edit#gid=0

15 Fruitport Area News: Parks PSA: “Avoid bittersweet in your holiday wreaths”
http://updates.fruitportareanews.com/2017/01/11/ottawa-county-parks-parks-psa/

16 Michigan.gov Invasive Species
http://www.michiganinvasives.org/training/

17 MLive “Project that has goats nibbling invasive species at county parks may end”

18 Melanie Manion -Natural Resources Management Supervisor
Ottawa County Parks

19 Town of Tryon Project
http://pacolet.org/town-of-tryon-project/

20 IMAGINews Winter 2016 “Invasive Species in Michigan”


22 “Aquatic Invasive Species Spread Prevention” The Nature Conservancy St. Lawrence-Eastern Lake Ontario Partnership for Regional Invasive Species Management
http://www.sleloinvasives.org/

23 “BE A HERO—TRANSPORT ZERO™” Illinois-Indiana Sea Grant Purdue University
http://iiseagrant.org/ais/transportzero.php

24 Tea4Science Soil Lessons:Soil Science Society America
Performance Standards

PS: MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*

PS: MS-LS1-5 Construct a scientific explanation based on evidence for how environmental factors influence the growth of organisms.

PS: MS-LS2.2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

PS: MS-LS2.4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

PS: MS-LS.1 Make observations of plants and animals to compare the diversity of life in different habitats.