



# HSTW Best Practices Newsletter

Spring/Summer 2017

Sponsored by HSTW Ohio Network, a not-for-profit organization supporting HSTW and MMGW sites in northeast Ohio

## Rural Literacy Design Collaborative

How do you provide high-tech, real world STEM experiences to students in rural school districts where the closest big city, colleges or businesses are miles away? Can students learn to think, act and write like a scientist or engineer? How do you get science teachers to challenge students to problem solve for a business by responding to a Request for Proposal (RFP), work in "business" teams, and write a compelling design report so that a business "hires" them for the job?

This newsletter provides best practice strategies explored by five rural school districts in Northeast Ohio to increase the number of students in grades 5 through 12, prepared with the STEM skills needed for success in college and careers.

## A Strategic Partnership: 5 Rural Schools, Battelle Education, HSTW NE Ohio Region & The PAST Foundation

In Ohio, school districts request grant funding from the Straight A Grant to bring innovative changes to education that will increase student achievement by challenging teachers to teach differently and inspire their students to own their learning, enhancing their college and career readiness skills. Battelle Education, an educational STEM initiative of the world class Battelle research organization that invented the Xerox machines, white-out and drone finders, teamed up with Northwestern Local Schools, HSTW NE Ohio Region and The PAST Foundation to lead the Rural LDC initiative over five-years. Black River, Hillsdale, Loudonville-Perrysville and Mapleton rural school districts joined this strategic partnership and committed to a five-year implementation scale-up approach. During the first year, 15 Cohort 1 science teachers, grades 5 through 12, were recruited, trained and supported through the development of two LDC science modules. These modules were designed for science teachers by Battelle Education, Metro High and Middle Schools, Columbus, Ohio, and Battelle scientists and engineers. HSTW LDC Coaches provided on-site, one-on-one coaching to guide each teacher through the process. The PAST Foundation was responsible to document the implementation to ensure that the practices and training components of the Rural LDC would be replicable and meet the intended goals of the grant.



## Northwestern High School

### LDC Science Module: Shipping Apples

Amanda Michalak [nrws\\_amichalak@tccsa.net](mailto:nrws_amichalak@tccsa.net)

Amanda Michalak, 9th grade science teacher, challenged her students to design a packing system that would ship apples across the county to arrive fresh, with no decay or damage. Students responded to a fictitious RFP from *Harry & David's* for a new shipping system for apples. Motivated to design the "winning" system, students worked in engineering teams responding to the RFP, and experimented with the design -- limited only by the constraints of money and time. Students designed, experimented and redesigned with a final apple shipping system. Each student submitted a design report using the information and data collected by their engineering team. Amanda guided the process by teaching the STEM skills needed for students to be successful with the scientific investigation and literacy skills. Student reports were reviewed and calibrated by the Cohort 1 teachers during a Battelle Education training, providing feedback to Amanda and her students.



## Loudonville High School

### LDC Science Module: Kombucha Design Project

Jim Conley [lopr\\_conley@tccsa.net](mailto:lopr_conley@tccsa.net)



Jim Conley, high school Biology teacher, challenged his students to respond to an RFP to produce a fermented tea drink that is marketable and profitable.

Students used science knowledge and skills of cellular metabolism, fermentation, cell respiration and ecology of microbes to produce a Kombucha flavored tea.

*What ingredient combinations can students produce to make a fermented tea drink that is marketable and profitable through the processes of cellular metabolism?*

After reading the RFP, conducting background research on fermentation, cell respiration, and ecology of microbes, and designing and testing fermented tea/various formulas, write a proposal in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and/or stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

For his second LDC Science Module: *Name That Bird*, Jim asked students this question:

*Can students design and develop a dichotomous key and identification guide that is the most accurate and efficient in identifying winter songbirds and raptors commonly found in Ohio?*



## Mapleton High School

### LDC Science Module: Dig This

Leanna Colosimo [mapl\\_lcolosimo@tccsa.net](mailto:mapl_lcolosimo@tccsa.net)

Leanna Colosimo, high school Physics teacher, challenged her students to respond to an RFP to design a shovel that would decrease the amount of force and work necessary to move dirt, mulch, straw, hay and other agricultural debris.

*How can a shovel be designed so that it would decrease the amount of force and work necessary to move dirt, mulch, straw, hay, and other agricultural debris?*

After reading the RFP, conducting background research on forces, work, power, shovel design (handle and blade), types of materials, human factors, cost and levers, and designing and testing a shovel, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and any other relevant diagrams to help convey your message to your readers. Identify any gaps or unanswered questions.



For her second LDC Science Module: *Lights Color Spectrum*, Leanna asked students this question: *Is it possible to construct a spectrometer from disposable items commonly found in the classroom?* After reading the RFP, conducting background research on spectrometers, line emission spectra, and light, light, and designing and testing the prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research.

# Mapleton High School

## LDC Science Module: Germ Masters Agar Solutions

Tony Bunt [mapl\\_abunt@tccsa.net](mailto:mapl_abunt@tccsa.net)

Tony Bunt, high school Biology teacher, challenged his students to respond to an RFP to grow bacteria quickly and affordably.

*What are the optimum environmental and nutritional conditions to grow bacteria quickly and affordably?* After reading a Request For Proposal (RFP) in which a pharmaceutical company is seeking an affordable, efficient protocol for culturing bacteria and a unique nutrient agar in which to grow the bacteria, conducting background research on prokaryotic cell reproduction, bacteria growth mediums, microbial metabolism, and environmental effects on bacteria growth, and designing and testing a series of bacteria growth protocols, write a protocol for growing bacteria cultures and develop a unique agar recipe in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include research and results gathered in the process of developing a growth protocol to help convey your message to your readers. Identify any gaps or unanswered questions.



# Loudonville Junior High School

## LDC Science Module: Battle of the Bacteria Blasters

Kori Aubel [lopr\\_kaubel@tccsa.net](mailto:lopr_kaubel@tccsa.net)

Kori Aubel, 7th grade science teacher, challenged her students to respond to an RFP to design and test homemade disinfectants that are safe, most effective in "killing" bacteria, and inexpensive.

*How can we create a safe, effective, and cheap homemade surface cleaner?* After reading the RFP, conducting background research on "How bacteria pass on their traits", "How disinfectants work, and effects of harmful chemicals in cleaners", and designing and testing cleaners made with different concentrations of different safe cleaning solutions, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP.



# Northwestern Middle School

## LDC Science Module: Crude Oil Catastrophe

Julie Hagans [nrws\\_jhagans@tccsa.net](mailto:nrws_jhagans@tccsa.net)

Julie Hagans, 7th grade science teacher, challenged her students to respond to an RFP to design an oil spill clean-up kit that is environmentally safe and removes oil from a bird.

*How can one create an effective and efficient product to remove oil from a bird after a catastrophic spill?* After reading the RFP, conducting background research on oil spills, environmentally safe cleansers, oil removal, and designing and testing your oil spill cleanup kit, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Include bibliography, citations, references, endnotes.



# Black River Elementary

## LDC Science Module: There's No Place Like Home

Michele Yocum [myocum@blackriver.k12.oh.us](mailto:myocum@blackriver.k12.oh.us)

Jill Beiser, Curriculum Coordinator [jbeiser@blackriver.k12.oh.us](mailto:jbeiser@blackriver.k12.oh.us)



*How can we most effectively create an aquatic ecosystem that sustains 5 out of 15 species for a period of 30 days?*

Michele Yocum, 5th grade science teacher, challenged her students to respond to an RFP to design a prototype of an ecosystem that could sustain the life of aquatic plants and organisms for at least 30 days. Students responded to an RFP with the design limitations of materials, money and time. Students designed, experimented and redesigned with a "habitat" and a group design report was completed. Michele stated, "I found that my students performed better on the assessments of the same standards taught last year. I plan to use this module again. This definitely builds independent learners while increasing the excitement and desire to become a scientist." Students said, "This way of learning was the best. It was so much fun watching our plants and fish and collecting data and evidence. Writing was a challenge, but we now know what a scientist must do to help the world to be a better place."

## Accomplishments: Rural LDC Science Cohort 1

- 15 teachers from 5 rural school districts collaborated and networked to improve science and literacy knowledge and skills
- 30 Literacy Design Collaborative (LDC) Science Modules were completed and reviewed by Battelle Education and HSTW NE Ohio Region coaches for opportunities to submit for national review
- 1,000 + students completed an LDC Science module and wrote a student team design report
- 5 district liaisons collaborated with the PAST Foundation, a national organization, Battelle Education, a state STEM organization, and HSTW NE Ohio Region, a regional organization to design, implement and monitor progress in developing a replicable Rural LDC Science implementation and sustainable model

In 2000, Ohio joined the Southern Regional Education Board (SREB)'s High Schools That Work (HSTW) national network. SREB located in Atlanta, GA. chartered 1987 by a consortium of 13 member southern states now has HSTW sites in over 30 states. In 2002, Ohio joined the SREB's Making Middle Grades Work (MMGW). HSTW and MMGW states are among the first in the nation to implement strategies that address the critical transition from middle grades into high school and successfully transitioning from high school to postsecondary enrollment, employment or enlistment in the military. HSTW NE Ohio Region was officially funded by the Ohio Department of Education (ODE) as one of four HSTW regional centers serving 36 high school and career technical center and 16 middle grade sites in northeast Ohio.

For more information on Rural LDC Science or HSTW NE Ohio Region, contact Diana Rogers, Regional Coordinator, [hstwdr@gmail.com](mailto:hstwdr@gmail.com) or the regional office at [hstwne@gmail.com](mailto:hstwne@gmail.com), 740.869.2650. Also visit [www.ohiohstw.org](http://www.ohiohstw.org) and [www.sreb.org](http://www.sreb.org)

### HSTW Ohio Network Board of Trustees

Jeffrey Layton, Chair  
Northwestern Local Schools

Jane Hogan, Vice Chair  
Mahoning County Career & Technical Center

Kelly Herold, Member At-Large  
University of Akron

Michael Cook, Trustee  
Sheffield-Sheffield Lakes City Schools

Jeremy Corbisello, Trustee  
Columbiana County Career & Technical Center

Jason Gray, Trustee  
Trumbull Career & Technical Center

Richard Goodright, Trustee  
Massillon City Schools

Dennis Honkala, Trustee  
Ravenna City Schools

Terry Wheeler, Trustee  
Educational Consultant

Barbara Williams, Trustee  
Akron Public Schools

Dan Stacy, Ex-Officio Member  
Ohio Department of Education

Diana Rogers, Executive Director  
Cindy Rolfe, Secretary/Treasurer  
HSTW Ohio Network

