

Promoting Science Literacy: Utilizing Food as a Tool to Teach Mathematics and Science

Presented to:

*Northern Illinois University
Board of Trustees*

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Professor of Interdisciplinary Health Professions
College of Health and Human Sciences



Melani W. Duffrin, PhD, RDN

Professor of Interdisciplinary Health Professions
FoodMASTER Initiative NIH Principal Investigator



Proud to be a Huskie →



Academic Appointments

- Professor Northern Illinois University. 2018-Current.
- Professor (2012) of Nutrition Science. East Carolina University. 2005-2018.
- Assistant Professor (2000) of Food and Nutrition. Ohio University. 1999-2004.

Education

- PhD in Education. March 2002. Curriculum & Instruction.
- RD Internship. July 1997. Internship. Winthrop University.
- MS in Education. June 1995. Interdisciplinary Studies.
- BS in Home Economics. June 1993. Dietetics. Western Illinois University.

Scholarship



Early Research – Pawpaw Fruit Sensory Evaluation

- Research attracted popular press
- Annual Ohio Pawpaw Festival Team Member (22nd Annual)



Later – FoodMASTER Initiative

- \$3.8 M in funding • 5 workbooks • 20 publications • 100+ presentations
- Directed Special Projects for ECU's STEM Ed Center
- Bridging the Gap NC STEM Conference Team Member (9th Annual)

The FoodMASTER Initiative is a compilation of programs aimed at utilizing food as a tool to teach mathematics and science.



**Current total:
\$3.8 M**

Research & Program Totals:

Classrooms:	78	Grade 3-8
Workshops:	270	Teachers
	58	Dietitians
Camps:	1000 +	Underserved Youth
	100 +	Youth Leaders

Research

Mentoring:	22	Undergrad Students
	12	Graduate Students

Outreach: Students & Professionals

Too many to count



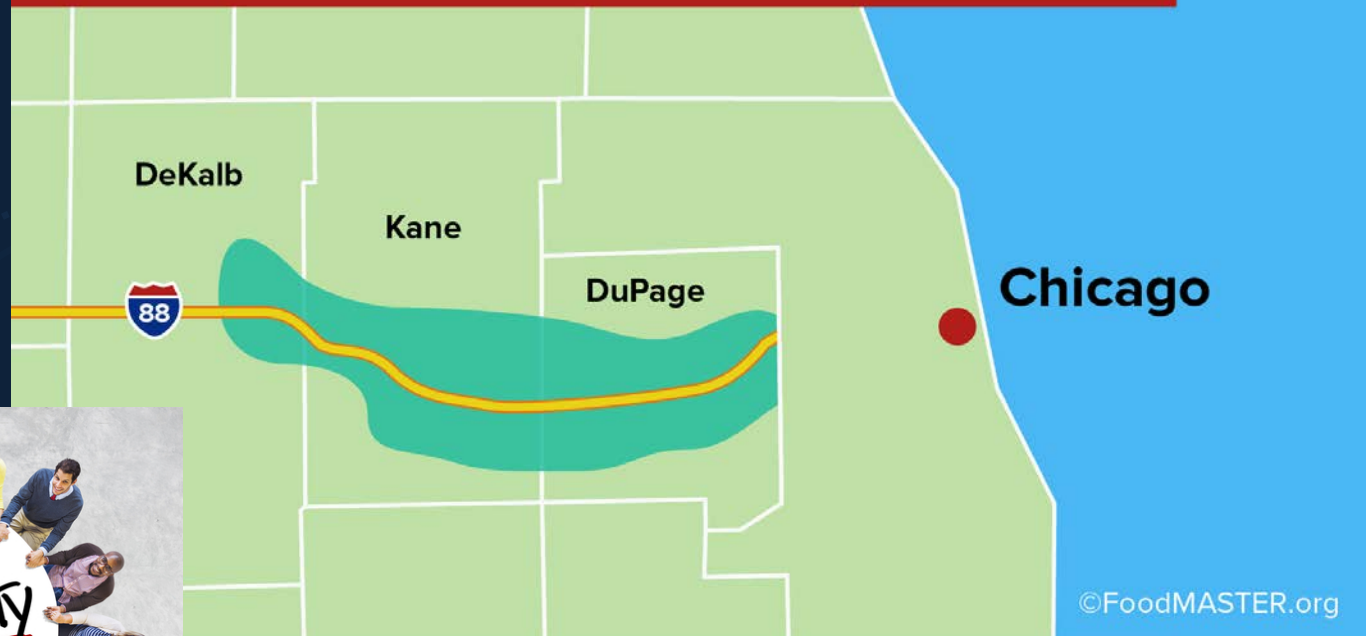
Why is science education research important?



- According to the United States (U.S.) Department of Commerce (2017) science professions are expected to grow by almost nine percent from 2014 to 2024.
- Preparing a scientifically literate U.S. population will not only be important for empowering productive citizenship, it will also be important for meeting the increasing demand for a U.S. scientific workforce.

Why is NIU and the surrounding region an ideal location for science education research?

The Illinois Technology and Research Corridor



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Science education research in surrounding communities builds a pipeline and attracts students to NIU's science majors.



Why FoodMASTER?

- Food is relevant subject matter.



How do you teach science with food?

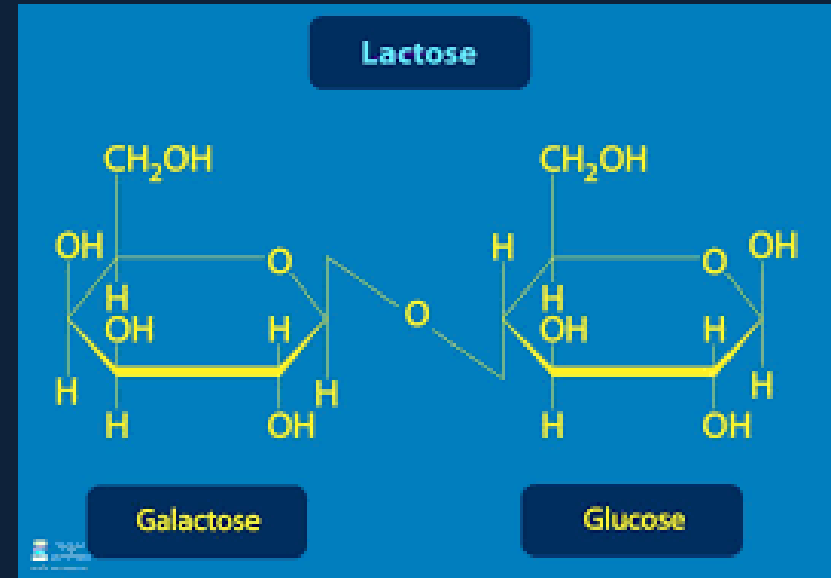
Middle Grades Sample Activities

Milk & Cheese Explicit Enzymes



Learning Objectives:

- Digestion of lactose
- Differentiate between monosaccharides and disaccharides
- Function of enzymes in digestion
- Identifying milk alternatives for lactose intolerant individuals.



Directions:

1. Take one glucose strip and quickly dip it into the milk. Wait 30 seconds and compare to glucose reference chart.
2. Did it test positive for glucose?
3. Next, crush the provided lactase pill and dissolve in the milk. Again, dip a new glucose strip and wait 30 seconds. Compare to glucose reference chart.
4. Did it test positive for glucose?

What does this activity teach us about the disaccharide lactose?

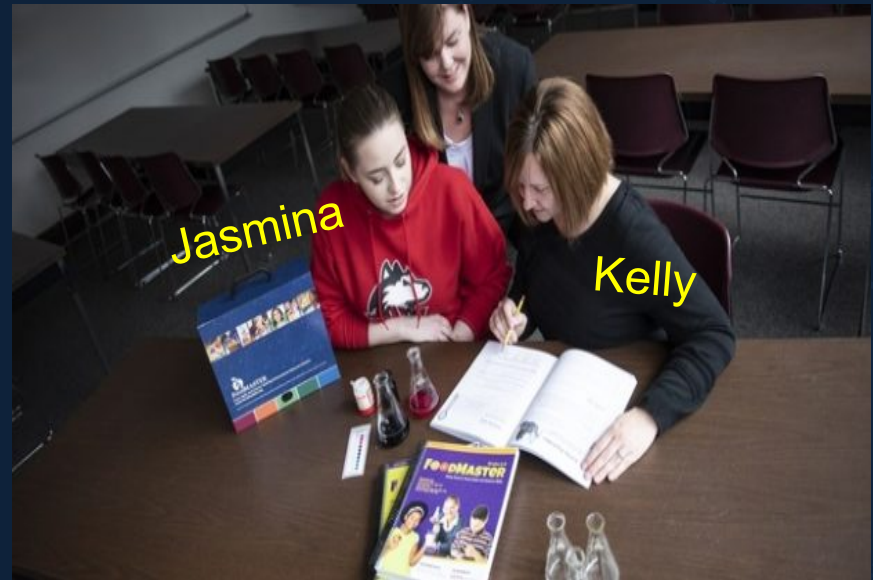
FoodMASTER Research

- Increases student mathematics, science, and nutrition knowledge.
- Improves student attitudes towards science.
- Engages students.
- Increases teaching confidence and satisfaction.
- Educators are better prepared to provide students with applied mathematics and science learning opportunities.



Other Benefits

- Provides service learning and research opportunities for NIU undergraduate and graduate students.
- Supports graduate assistantships.
- Many FoodMASTER students pursue MS and PhD degrees.



Current graduate students: Jasmina Mesic and Kelly Furr
First generation college students. Both intend to pursue PhDs.

Experience Supports Interdisciplinary Doctoral Student Research

My first NIU
doctoral advisee



Paris Thomas
Chicago Gun Violence Research
Collaborative Fellowship

My awesome colleagues →

Dr. Clay
Dr. Mazurek



← Inspired by

Health disparities working group



← Alexis
Working on
Small Business
Research Grant
NIH SBIR

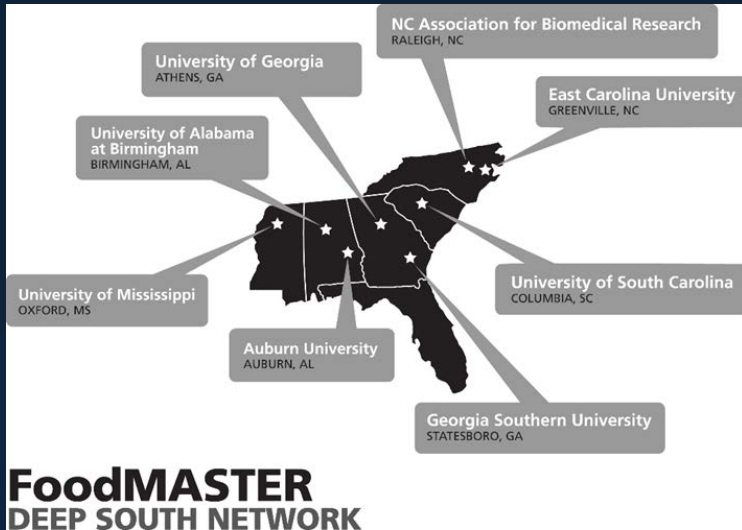
Jerian →
Just submitted
Doctoral Research Grant
NIH R36



Enhancing NIU's National Reputation



Deep South Network



Reach to Teach



Other Partnerships



Example → Love a Sea Turtle Foundation

- NC Association for Biomedical Research
- Texas Teacher Summer Institute
- Phipps Conservatory and Botanical Gardens
- NC State Center for Education Informatics
- West Virginia University Health Sciences & Technology Academy
- Nerd Clutch – Education Technology Small Business Start-up
- USDA National Agricultural in the Classroom agclassroom.org

Youth Leadership



NIU Regional FoodMASTER Outreach



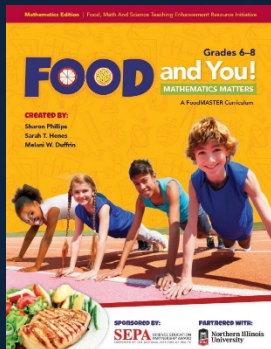
STEM Fest



**NIU P-20 Summer Teacher Institute
DuPage Co Teacher Institute Day**



**Plano school district
NIU P-20 Online Camp**



**Steaming It Up
Conference**



**West Suburban Academy
of Nutrition and Dietetics**

NIU FoodMASTER Recognized



**STEM tricks to teach
your at-home cooks**

NIU Research

3 Publications

- Start-up and sustaining 20 years of STEM outreach research and programming: The FoodMASTER Initiative. *Journal of STEM Outreach*. 3(2)1-9. (Duffrin, et. al., 2020)
- Community violence and African American male health outcomes: An integrative review of literature. *Health Soc Care Community*. 00:1-14. (Thomas, et.al., 2019)
- Validation of a Short Form Assessment of Attitudes in Science Constructs for Fourth Grade (AASC-4). *Journal of STEM Outreach*. 1(1)1-13. (Diaz, et. al., 2018)

6 Poster Presentations

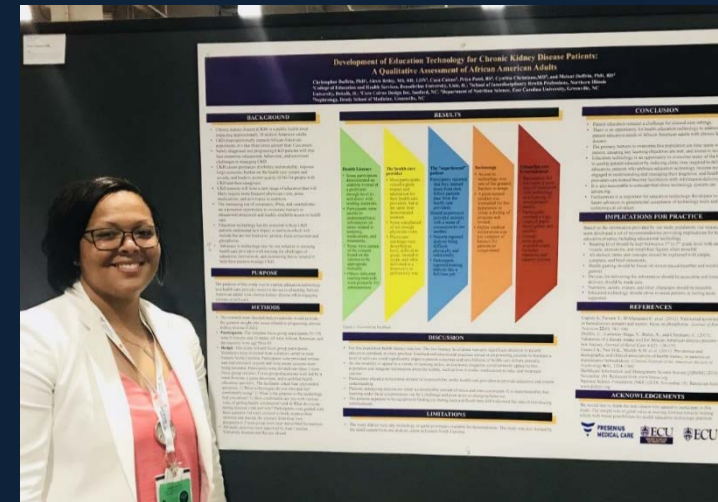
- Food & Nutrition Conference & Expo. 2019 & 2020.
- National Kidney Foundation Clinical Meeting. 2019.
- Bridging the Gap. 2019

6 Oral Presentations

- NIH Sci Ed. 2019
- Bridging the Gap. 2019
- Steaming It Up. 2019
- West Suburban Academy of Nutrition and Dietetics. 2019

Award

- 1st Annual Leadership in STEM Education Award
- NC Association for Biomedical Research 2018



NIU accepts \$930,000 NIH grant for FoodMASTER program March 13, 2019

The Future



Permanently establish FoodMASTER as a NIU P-20 Center program and serve as an outreach component of the NIU Center for Community Sustainability.

Continue to pursue external funding opportunities with multidisciplinary teams of faculty across NIU's campus.



Establish an Endowed FoodMASTER Professorship

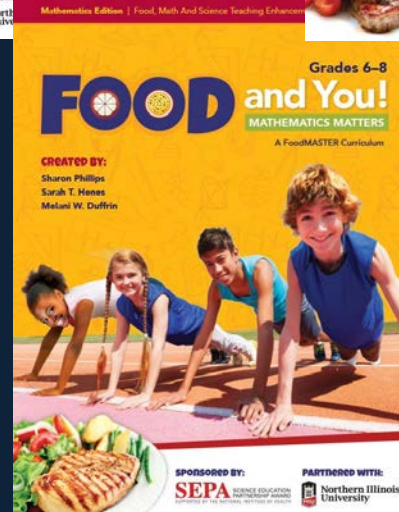
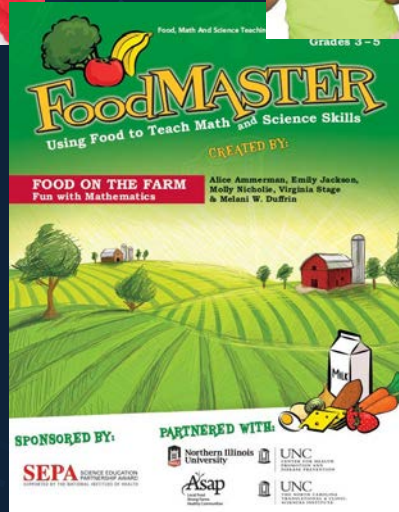
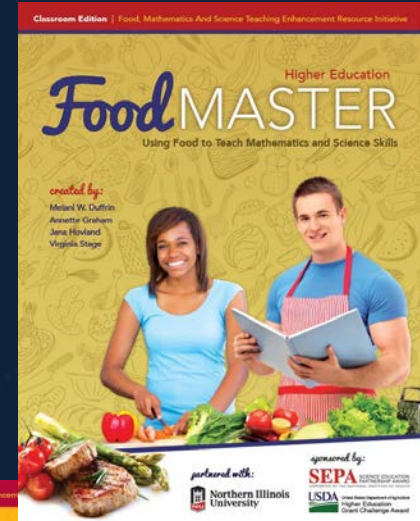
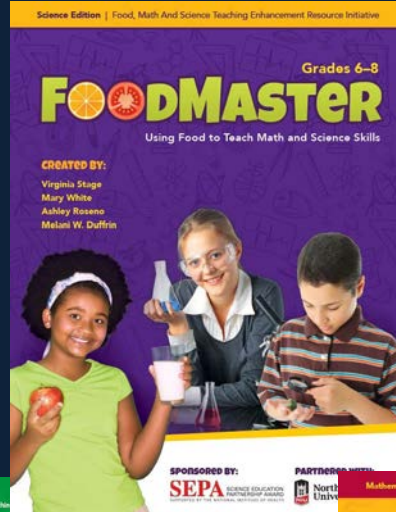
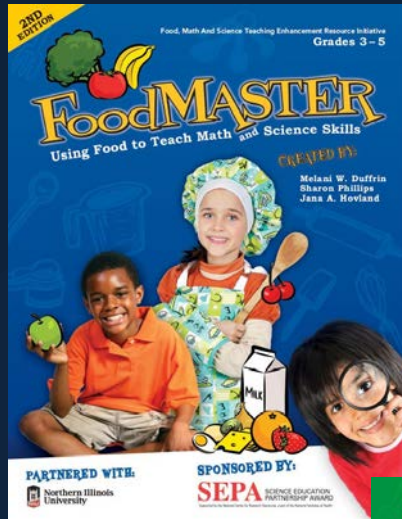
Dream Headline

"XXXXX Endows NIU FoodMASTER Professorship"

Become recognized as a State of Illinois innovative science education program and serve as model to others.

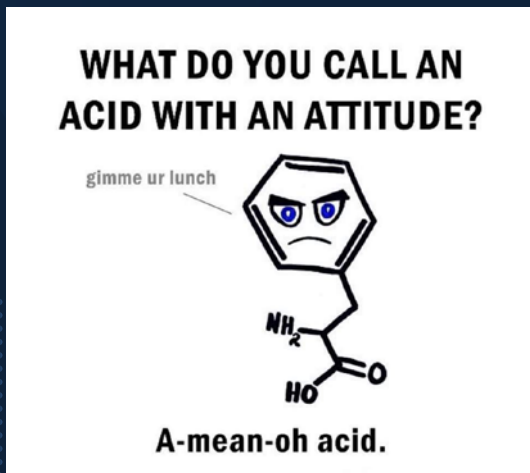
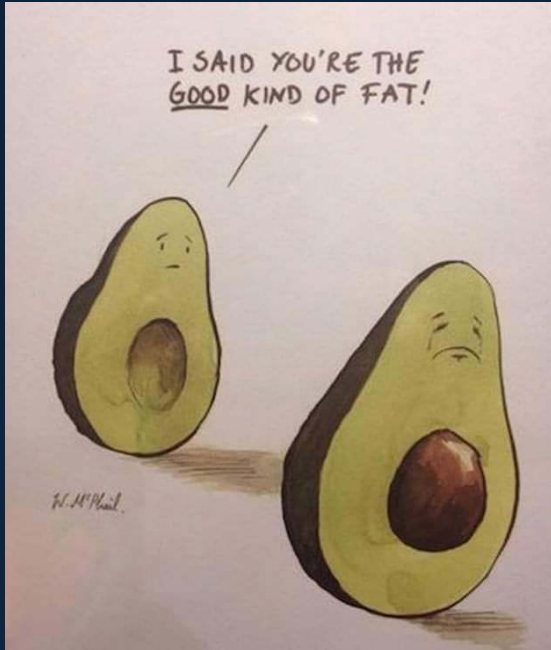


www.foodmaster.org



Questions?

Hope you enjoy the day!



Thank you!

