FoodMASTER: REACH TO TEACH!

Partnering Dietitians with Science Education Communities

Sylvia Escott-Stump, MA, RDN, LDN, FAND
Melani W. Duffrin, PhD, RDN

Food, Math And Science Teaching Enhancement Resource Initiative
Learning Objectives

Participants will be able to...

• Identify and promote food concepts for teaching science to children and teens
  - CDR 6040 Education Theories and Techniques for Children and Adolescents

• Promote strong science educator influence to increase the pipeline of students entering STEM professions, especially minorities and women
  - CDR 6080 Training, Coaching and Mentoring

• Describe 3 key benefits of the FoodMASTER curriculum related to science education
  - CDR 9020 Evaluation and Application of Research
Commission on Dietetic Registration

Learning Need Codes

• 4000 Wellness and Public Health

• 4020 Community Program Development

• 6000 Education, Training

• 6040 Education Theories and Techniques for Children and Adolescents

Performance Indicators
Pre-Test

What does STEM stand for?

1. Systems, Teacher Education, Management
2. Serious Trainer Education Multiples
Pre-Test

What does FoodMASTER stand for?

1. Food, Management and Science Training Initiative
2. Food, Math and Science Teacher Education Resource Initiative
3. Food, Management and School Technology Resource Initiative
4. Food, Math Art Science Teacher Education Resource Initiative
Pre-Test

Do you think dietitians should know how to write grants?

1. Yes
2. No
3. I don’t know
Pre-Test

What do science teachers care about?

1. Ease of preparation and implementation
2. Confidence in their ability to teach content
3. Student engagement
4. Student learning
5. All of the above
Pre-Test

How can you help promote use of the FoodMASTER curriculum?

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3. Write an article for your local newspaper
4. Tell your family about it
5. All of the above
Did YOU enjoy food science?
Yuck. They always put too much NaCl on the fries.

Definitely a good pH level on this salad dressing. Lots of hydrogen ion activity!

I hope they made the cobbler with: ![Chemical structure](image1) AND NOT: ![Chemical structure](image2)

Hey, molecular gastronomy's a legit thing! Look it up!

You guys seem normal. Can I sit here?
Presentation overview

- Part 1
- What is STEM Education and why use FoodMASTER?
- Part 2
- The Curriculum
- Part 3
- Making a Difference
What is the Problem?

Children only receive an estimated 3 hours of food and nutrition science education in schools each year.
Our Solution

- Partnering dietitians with STEM education communities!!

- How many of you have heard of STEM or STEAM EDUCATION??
What is STEM Education?

• A movement in American Education to help teachers and their students understand how the academic disciplines of **Science, Technology, Engineering and Mathematics** impact their world and prepare them for the workforce of tomorrow.

• **STEAM** includes **ART** as well
What STEM Jobs Come to Mind?

- Engineering
- Technology
- Math
- Science
STEM Learning Environments

Formal - K-12

Informal - after-school, science museums,
youth clubs

Trends = Early STEAM; targeting underserved populations
STEM Education Opportunities for Dietitians

- Dietitians have always been champions for promoting public understanding of food and nutrition science!!
  - Gateway for women in science
  - Involved with school and health-care operations.

- New opportunities exist for influencing food and businesses as consumers demand healthier choices.
  - One program you might consider – FoodMASTER
Compilation of programs aimed at using food as a tool to teach mathematics and science.
FoodMASTER program projects began in 1999. Supported by NIH since 2005. USDA has supported FoodMASTER.

FoodMASTER is supported by the National Institutes of General Medical Sciences (NIGMS).
- FoodMASTER Intermediate Teacher & Student Editions
- Food on the Farm
- FoodMASTER Middle Grades Science
- FoodMASTER Higher Education

www.foodmaster.org
FoodMASTER

“Trojan Horse” of Nutrition Education

- Access to formal and informal education learning environments

- Focusing on mathematics and science academic achievement
  - using food and nutrition science
Why Should We Use Food?
Why?

1. Students have preexisting contextual experiences
2. Conducive for hands-on activities
3. Concepts in biology, chemistry, environmental sciences, math, nutrition, health
4. Both engaging and motivating!
Math + Science Skills = Healthy Living

• Academic success in math and science is a foundational component for understanding health and nutrition.

• Food and Nutrition Science knowledge and skills lead to healthy living.
Educating children in formal and informal learning environments impacts…
Desired Outcomes

- Increased confidence for approaching **partnerships** with science educators
  - Meet educators “where they are”
  - Increase teacher knowledge and efficacy

- Increase **student exposure** to science content

- Enhance **family outreach** through children
Part 2: The Curriculum

Curriculum Structure & Activities

What do K-12 teachers care about?

Is there data to support FoodMASTER?
FREE Available resources

www.foodmaster.org
Sample Curriculum

- Measurement
- Food Safety
- Management

- Meats
- Eggs
- Fats & Oils
- Grains
- Vegetables
- Fruits
- Milk & Cheese
Chapter 5: Milk & Cheese
Explicit Enzymes

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

Chapter 8: Sugar
Sweet Saccharide

- Identify glucose, fructose, and sucrose
- Determine glucose concentration of unknown solutions
- Calculate calories in food due to simple sugars
- Identify ways to reduce sugar intake
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?
Sugar
Sweet Saccharide

Questions

1. Do you think sugar (sucrose) water will test positive for glucose?

2. Why or why not?
Think of Other Activities Using Food

DISCUSS…

5 ways to taste S.T.E.A.M.

5 ways to smell S.T.E.A.M.

Left Brain Craft Brain

Left Brain Craft Brain

FoodMASTER
Share Your Ideas
What Do Educators Care About?

- Ease of preparation and implementation
- Confidence in their ability to teach content
- Formal environments:
  - Student engagement
  - Student learning
  - Student achievement
Grade 3-5

*Something is Fishy*: Fish in the Kitchen Activity
Nutrition Knowledge

Development

▪ Pilot Testing
  - 2009-2010 FoodMASTER Implemented in 4th Grade Classrooms
  - 9 in North Carolina
  - 9 in Ohio

▪ Pre- and Post-test Exam:
  - Nutrition Knowledge: 28 Questions
  - Multidisciplinary Science Knowledge: 13 Questions
  - Mathematics Knowledge: 20 Questions
Figure 1: Control versus Intervention Nutrition Knowledge Scores (28 questions)

*Post-test score after adjusting for baseline scores
FoodMASTER Outcomes

- 10-15 hours of education are needed to observe significant changes in program-specific knowledge.

  - FMI students were exposed to an average of 18 hours of food-based education over the academic year compared to the 3.4-hour national average.

- FMI teachers displayed gains in self-efficacy toward teaching nutrition

- Does not detract from performance on achievement on standardized tests.
FoodMASTER Outcomes

FoodMASTER Middle Grades Science

- Teachers felt FM was a **valuable experience**
  - willing to repeat over half the chapters

- Motives for teacher willingness to repeat activities:
  - student enjoyment
  - standard alignment
  - easy instructions
  - professional development training experience
  - lots of additional resources.

Teacher comment on end of grade improvement - “..*overall, our kids did really well on the EOGs, so I know that this had a really good impact...*”
Implications

- FM supports the potential for food and nutrition science subject matter to garner when more classroom instruction time.
- Materials are aligned with national and state standards.
- This method enables students to demonstrate knowledge acquisition through standardized testing.
Part 3: Making a Difference

What can you do?

FoodMASTER Next Steps…
As you can see, we take the concept of local food very seriously...

Make It Fun!!
RDNs can S.A.V.E. the World!

Seek opportunities
Advocate for nutrition policy and change
Voice expert opinions
Expand knowledge

Courtesy of South Carolina Academy of Nutrition and Dietetics, 2016
What Can YOU Do?

Check Out the Resource!  

Become a CHAMPION!
Website

Tell teachers: www.foodmaster.org

Kids and adults alike interact with food everyday. Without even realizing it, we are exposed to dozens of mathematic and scientific concepts almost every time we prepare food! That makes food an exceptional tool for teaching math and science to virtually all ages.

The FoodMASTER initiative is a compilation of hands-on and virtual programs that use food to teach math and science skills. Subjects covered include biology, chemistry, microbiology, nutrition, and health, as well as math concepts such as numbers and operations, algebra, geometry, measurement, and problem solving.
Emphasize Curricular Resources are Teacher Tested and FREE
Offer to Speak or Do Activities

- Schools
  - Classrooms
  - Science Fairs
  - After School Programs

- Start FoodMASTER Fridays
Offer Teacher Professional Development
Help Your Community

- Identify and apply for STEM grants
- Build partnerships with like-minded organizations
- Be entrepreneurial
  - Offer teacher professional development in school districts
  - Offer food science or cooking programs
STAY CONNECTED!

Let FoodMASTER know what you are doing and how we can help with:

- Teacher Professional development
- Classroom activities
- Grant program advice
Dissemination

- FoodMASTER Reach to Teach
- Multi-State Partnerships
- Teacher Professional Development
- Informal Science Education Environments
- Gaming and Artificial Intelligence Product Development
Affiliate Training

Arkansas

New Hampshire

New Mexico

North Carolina

Ohio

Oklahoma

South Carolina

South Dakota
International Training

Thailand

Singapore

Portugal

Mexico

Antigua

Hungary
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Research and Publications


Take Home Message…

“Tell me and I forget. Teach me and I remember.

Involve me and I learn.”

- Benjamin Franklin