**FoodMASTER: REACH TO TEACH!**

Partnering Dietitians with Science Education Communities

**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

**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
**STEM Learning Environments**

**Formal** - K-12

**Informal** - after-school, science museums, youth clubs

**Trends** = Early STEAM; targeting underserved populations

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**STEM Education Opportunities for Dietitians**

- Dietitians have always been champions for promoting public understanding of food and nutrition science!!
  - The dietetics profession has a history of being a gateway for women in science.
  - Dietitians are heavily 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

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**FoodMASTER**

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

“Trojan Horse” of Nutrition Education

FoodMASTER provides access to formal and informal education learning environments by focusing on mathematics and science academic achievement using food and nutrition science.
Why Use Food?

1. Students have preexisting contextual experiences
2. Conducive for hands-on activities
3. Concepts derived in biology, chemistry, environmental sciences, math, nutrition, health
4. It’s 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.

Big Impact

Educating children in formal and informal learning environments impacts...

Future Generations
Communities
Families
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

Available resources - FREE www.foodmaster.org

Curriculum Structure & Activities
What do K-12 teachers care about?
Is there data to support FoodMASTER?

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

Chapter 5: 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?

Middle Grades Sample Activities

Chapter 8: Sugar
Sweet Saccharide
Questions
1. Do you think sugar (sucrose) water will test positive for glucose?
2. Why or why not?
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
  - North Carolina (9 classrooms)
  - Ohio (9 classrooms)
- 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 scores after adjusting for baseline scores.

**Nutrition Knowledge Results**

<table>
<thead>
<tr>
<th>Group</th>
<th>Total Nutrition Knowledge Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>15.50 ± 3.83</td>
</tr>
<tr>
<td>Post-Test</td>
<td>20.02 ± 4.24</td>
</tr>
<tr>
<td></td>
<td>13.98 ± 2.22</td>
</tr>
<tr>
<td></td>
<td>15.35 ± 3.81</td>
</tr>
</tbody>
</table>

*Post-test score after adjusting for baseline scores.*

**FoodMASTER Outcomes**

**FoodMASTER Intermediate (FMI)**

- The School Health Education Evaluation reported that 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.
  - A significant difference in general science, mathematics, and nutrition knowledge (research developed exams) was detected between the intervention group and control group.
- FMI teachers displayed gains in self-efficacy toward teaching nutrition that were significantly greater than changes observed in the matched comparison group.
- Does not detract from efforts to ensure students perform well on standardized tests.

**FoodMASTER Middle Grades Science**

- Teachers felt FMM was a valuable experience for middle school students and were willing to repeat over half the chapters.
- Motives for teacher willingness to repeat activities: student enjoyment, standard alignment, ease of instructions, professional development training experience, and the provision of additional resources.

  Teacher comment on EOG 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 more K-12 classroom instruction time when 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…

RDNs can S.A.V.E. the World!

Seek opportunities
Advocate for nutrition policy and change
Voice expert opinions
Explore hot topics

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

Emphasize Curricular Resources are Teacher Tested and FREE

- FoodMASTER Intermediate Teacher & Student Editions
- Food on the Farm
- FoodMASTER Middle Grades Science
- FoodMASTER Higher Education
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
  - What other ideas???
STAY CONNECTED!

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

- Teacher Professional development
- Adult Learner
- Document results
- Classroom activities
- Grant program advice

Take a Minute for an Activity!

Pair and Share

- Partner with your neighbor or table mates
- List as many food and nutrition activity ideas you can think of that convey science and/or mathematics concepts.
Let’s Share Your Ideas

Take-Home Message:

YOU Can Make This Difference Too!
- What Others are Doing:
  - ECU, Georgia state, UAB - Youth Clubs, Boys & Girls clubs
  - Auburn, New Hampshire - Formal K-12
  - University of Mississippi - Summer feeding programs and STEM

FoodMASTER Next Steps

Disseminate
- FoodMASTER Reach to Teach
- Multi-State Partnerships
- Teacher Professional Development
- Informal Science Education Environments
- Gaming and Artificial Intelligence Product Development
Affiliate Training
New Hampshire (Manchester)  North Carolina (Durham)

International Training
Thailand  Portugal

Take Home Message…
"Tell me and I forget. Teach me and I remember. Involve me and I learn."
- Benjamin Franklin
Research and Publications


What are Your Questions?

Figure 2: Control versus Intervention Mean Science Knowledge Scores (13 questions)
Figure 3: Control versus Intervention Mean Math Knowledge Scores (20 questions)