FoodMASTER: REACH TO TEACH!

Partnering Dietitians with Science Education Communities
Disclosure

FoodMASTER is supported by the National Institute of General Medical Sciences (NIGMS)

www.foodmaster.org
Objectives for This Talk

• 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 teacher 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
Background

PART ONE
What is the Fundamental Problem???

- Despite efforts of the federal and state governments, businesses, and health education communities to improve food and nutrition science understanding...
Reality Check

• Children only receive an estimated 3 hours of food and nutrition science education in schools each year
The majority of the population obtain their food and nutrition science information from the mass media.

Lack of this knowledge continues to plague our citizens and exacerbate chronic disease!
What Else???

• Communities that are most impacted by this knowledge deficit face challenges in:
  • Preparing their children for science and health careers
  • Attracting health professionals to their communities

• Also
  • Maintaining healthcare system capacity to address health disparities, causing even larger gaps in outcomes and costs
Our Solution = FoodMASTER

• Partnering dietitians with science education communities!!
What is the FoodMASTER Initiative?

The **Food, Math And Science Teaching Enhancement Resource Initiative**: a compilation of programs aimed at improving the public understanding of Food and Nutrition Sciences

Calder, 2003; Phillips, Duffrin, & Geist, 2004
Raise a Hand

• 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/STEAM EDUCATION

- Formal = K-12
- Informal = after-school, science museums, youth clubs
- Trends = Early STEAM, targeting underserved populations

- How does it advance public understanding of science and math?
  - Science and Mathematics are vital to our future
  - Science is everywhere; it shapes our everyday experiences...including plants and food!
Careers for Our Children

• STEM is their future—the technological age in which they live, their best career options, and their key to wise decisions.
  – The US Department of Labor listed the ten most wanted employees; eight require STEM degrees!
  – According to the U. S. Department of Commerce, STEM occupations are growing.
    • Health care workers will average 20% more in lifetime earnings than peers with similar degrees in non-health care.
CHALLENGES FOR DIETITIANS

• Not enough professional dietitians to reach all outlets for food and science information

• Competition from non-reputable sources

• K-12 school environments focus heavily on subject content for standardized testing, leaving little time for nutrition 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
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
FoodMASTER Curricular Resources

- FoodMASTER Intermediate Teacher & Student Editions
- Food on the Farm
- FoodMASTER Middle Grades Science
- FoodMASTER Higher Education
“Trojan Horse” of Nutrition Education

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

- Students have preexisting contextual experiences
- Conducive to hands-on activities
- Concepts in biology, chemistry, environmental sciences, math, nutrition, health
BEST OF ALL...

Engagement and Motivation!

- **Food engages multiple senses:**
  - VISUAL, TASTE, SMELL, TOUCH...
  - EVEN SOUND!
Kids Have Fun

• “It’s like hiding your vegetables in the spaghetti sauce”

• FoodMASTER Fridays

Banana Experiment
Which Will Ripen First?
Math + Science Skills = Healthy Living

• Academic success in math and science is a foundational component for success in life

  – Food and Nutrition Science knowledge and skills lead to healthy living.
Big Impact!

Educating children in formal and informal learning environments

- Impacts families
- Impacts communities
- Impacts future generations!!
TAKE A MINUTE FOR AN ACTIVITY
Group Activity

- Partner with your neighbor or table mates
- Think of a food
  - Identify possible science projects
Share Your Ideas

Examples
PART TWO
Sample Curriculum

- Measurement
- Food Safety
- Management

- Meats
- Eggs
- Fats & Oils
- Grains
- Vegetables
- Fruits
- Milk & Cheese
Methods

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
Sample Activity

**Activity A:** Browning

**Activity B:** Color Changes in Acids and Bases

Red Cabbage Color changes with pH

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FoodMASTER
What Do Teachers Care About?

- Ease of preparation and implementation
- Confidence in their ability to teach content
- Formal environments:
  - Student engagement
  - Student learning
  - Student achievement (standardized testing)
Teacher Video
PART THREE
Nutrition Knowledge Results

Figure 1. Control versus Intervention Nutrition Knowledge Scores (28 questions)

*Post-test score after adjusting for baseline scores
Figure 2. Control versus Intervention Mean Science Knowledge Scores
(13 questions)
Math Knowledge Results

Figure 3. Control versus Intervention Mean Math Knowledge Scores (20 questions)
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.
- For professionals interested in ensuring intermediate school-age children receive food and nutrition education, integration with science and mathematics may be ideal domains, and vice versa without detracting from efforts to ensure students perform well on achievement on standardized tests.
FoodMASTER Outcomes

FoodMASTER Middle Grades Science

- A significant difference was detected in science and nutrition knowledge between the intervention group and control group. Researcher-developed tools were created using the AAAS Project 2061 Science Assessment and the Health Assessment Project item banks.

- 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...”
Discussion

- Students exposed to an integrative food-based curriculum will achieve gains on nutrition, science, and mathematics questions.

- These questions are important foundational information for many science disciplines.

- This allows teachers to stay within the scope of what they are teaching about science without having to compete with other subjects for instructional time.
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.
Research & Publications


YOU CAN BECOME A FOODMASTER CHAMPION!

PART FOUR
Next Steps

DISSEMINATE!

• Reach to Teach

• Teacher Professional Development
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
Formal Education

State Boards of Education
- Letters of support
- Departments of Public Instruction
  - Alabama
  - Georgia (Donna Martin)
  - Mississippi
  - North Carolina (Lyn Harvey)
  - South Carolina

Departments of Science Education
- Partnerships
- Regional RDN Champions
  - “Reach to Teach” program
  - 3-5 teachers per year
- Numeracy assessment, science scores
Informal Education

Children and Teens
- Compare rural and urban sites
- Boys and Girls’ Clubs –
  - Day camps
  - Week-long camps
- After-School programs
- 4-H programs, Scouts
- Museums

Teacher Professional Development
- Regional National STEM Teachers Association meetings
  - Booths, Exhibits
- Department of Public Instruction
  - 4 or 6-Hour workshops
  - Starter kits
  - Collaborate with Cooperative Extension agencies
Affiliate Training

New Hampshire (Manchester)  North Carolina (Durham)
International Engagement

Greece

Portugal
What Can YOU Do?

Check Out the Resources!

Become a CHAMPION!

FoodMASTER
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.
SHARE THE FREE CURRICULAR RESOURCES

Modules

- Intermediate Teacher & Student Editions (Grades 3-5)
- Food on the Farm (Grades 3-5 Mathematics Supplement)
- Middle Grades Science (Grades 6-8)
- Higher Education

Posters

[Image of a book cover titled FoodMASTER: Using Food to Teach Math and Science Skills]
Offer to Speak or Do Activities

• Schools
  – Classrooms
  – Science Fairs
  – After School Programs

• Start FoodMASTER Fridays
OFFER TEACHER TRAINING
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
Our Take-Home Messages
“Tell me and I forget. Teach me and I remember.

Involve me and I learn.”

- Benjamin Franklin
Setting Up Teacher Professional Development

PART FIVE
Train the Trainer: Professional Development Model

1. Plan and Promote the Topic
2. Design and Implement Effective Programs
3. Assess Capacity
4. Build Local Support
5. Evaluate and Sustain the Program
Reach to Teach -- Teacher Army!

- Teacher Takes Over
- Co-Teaches
- Pairs with Teacher
- Trainer Practices
- Trainer Attends
Bloom’s Taxonomy

**Original Terms**
- Evaluation
- Synthesis
- Analysis
- Application
- Comprehension
- Knowledge

**New Terms**
- Creating
- Evaluating
- Analysing
- Applying
- Understanding
- Remembering
• Raise your hand if you took formal classes on how to TEACH adults
Pedagogy vs Andragogy

**Pedagogy**
- Formal climate and structure
- Orientation: future, someday
- Teacher dominant and student dependent
- Motivation by external rewards or punishment

**Andragogy**
- Informal climate
- Orientation: the present/now
- Reciprocity in transactions
- Learner is independent
- Learning is problem-centered
So--Who is The Adult Learner?

Adult Learners

need
- problem centred learning

most motivated by
- subjects relevant to them

bring experience
- basis for learning
- including mistakes

need to be involved

in
- employment
- life

in
- planning instruction
- in planning evaluation
Erikson’s Stages of Development

- Early Adulthood  18 – 30
- Middle Adulthood 31 – 65
- Late Adulthood  65+

Stages of Psychosocial Development

- Trust vs Mistrust
- Autonomy vs Shame & Doubt
- Initiative vs Guilt
- Industry vs Inferiority
- Identity vs Role Confusion
- Intimacy vs Isolation
- Generativity vs Stagnation
- Integrity vs Despair

Proposed by Erik Erikson
FOCUS IS ON

The

LEARNER!!
Skills Needed

COACHING

mentor coach

ability mentor coach
advising learning education
motivation development practice
knowledge skill
workshop instruction
Thank You!

•“The best part of learning is sharing what you know.”
— Vaughn K. Lauer