Family & Consumer Sciences:

An Important STEM Connection
Audience Participation
What are the FCS content topics taught?
Who Are We?

Work And Family

Technical Training

Career Support

FCS: An Important STEM Connection, G Randel, grandel@ksde.org
FCS: An Important STEM Connection, G Randel, grandel@ksde.org
Inquiry based

Communication Skills

Project based

Problem based

Teamwork
“Because of the rapid changes both technological and social, it is becoming less possible to operate our lives effectively using old paradigms.

The learners today will be living in a society that will require its citizens to think constructively, make sound decisions, solve problems, access information and take responsibility for their own lives.

The educational challenge is to build essential skills for learners to become “stars for adult life”.

Source: KS Personal and Family Wellness, 1995

FCS: An Important STEM Connection, G. Randel, grandel@ksde.org
Process Skills
21st Century Skills
Common Career & Technical Core (CCTC)
Process Skills—Impact both

FCS: An Important STEM Connection, G Randel, grandel@ksde.org
Directs what is FCS in the U.S. including:

- 16 standard areas
- Occupational FCS
- Work and Family FCS

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www.nasafacs.org
Life Literacy

Occupational FACS

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Randel, grandel@ksde.org
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Audience Participation
What careers are associated with each FCS content area?
Authentic real world Applications of FCS content and process.
Connections:
National Programs
- Community Service
- Plan Process
- Leadership

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And then there are the...

**Competitive Events**

--Plan Process

--Rubric (21st century skills)

--Leadership

--Authentic Assessment
Audience Participation
Review
Discuss
Report

1. Title
2. Summarize
3. Connections to FCS
FACS Connection (?)

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Question

Do you know what STEM means?

A. YES
B. NO
C. MAYBE
The intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.
TECHNOLOGY

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the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science (including family and consumer sciences)
The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, machines, processes, and systems.
MATHEMATICS

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the science of numbers and their operations, interrelations, combinations, generalizations, and abstractions and of space configurations and their structure, measurement, transformations, and generalizations
U.S. Department of Labor—STEM Occupational Divisions:

Chemistry
Computer Science
Environmental Science
Geosciences
Life Sciences
Mathematics
Physics/Astronomy
What are STEM jobs?

"application of STEM content"

"Forensic Investigation"

Classic: Scientists, Engineers

"Computer Science, Vet Medicine"

"Health Science"

Real World--Integrated/multidisciplinary

“making connections across silos” (iSTEM)
Planning, managing and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory/testing services, and research/development services.
STEM Literacy
What is STEM?

“The whole is greater than the sum of its parts. STEM is the proxy for the ‘innovation economy’.”

“There is still no official definition of STEM Education.”

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The STEM LEADER GUIDE—

STEM Education is:
1) STEM Literacy
2) STEM Careers

AND

Address diversity as a possible solution (increase female and minority STEM professionals).

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STEM literacy… two parts:
The STEM Leaders Guide--Page 8

STEM Thinking and Reasoning:
- Thinking and Reasoning;
- Collaboration
- Problem Solving;
- Creativity

Instructional Strategies:
- Problem based
- Project based
- Inquiry based
- Challenge based

G Randel, grandel@ksde.org
STEM Processes:
- Frame a problem
- Brainstorm solutions
- Test method
- Gather data
- Assess results

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Overall STEM Education...

Integrates science, technology, engineering & math into one learning experience

Uses Project-based learning

Reinforces real world application

 Prepares students for integrated careers

Develops “soft” & technical skills
Where’s the FACS connection?
Process Skills?
Process Skills
21st Century Skills
Common Career & Technical Core (CCTC)
“personal qualities, habits, attitudes & social behaviors that make an individual a good employee”

- verbal/written communication skills
- leadership skills
- organization skills
- curiosity & imagination
- creative problem-solving skills
- technology experience
- teamwork skills
- following directions
- time management
- desire to learn
SOFT SKILLS

“personal qualities, habits, attitudes & social behaviors that make an individual a good employee”

verbal/written communication skills

leadership skills

organization skills

curiosity & imagination

creative problem-solving skills

technology experience

teamwork skills

time management

following directions

desire to learn

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Verbal Communication — Relationship Education; FCCLA
Teamwork/Leadership /Time Management — Class projects completed in teams in all courses; FCCLA
Ability to follow detailed instructions — Technical reading projects, Professional Learning Experiences
Creative Problem Solving — Case studies in which practical problem solving have no one answer
Strong Science skills — Food Science labs; Nutrition labs
Curiosity and Imagination — Early child development interactions and labs.
Experience with Technology and Tools — Access to and use of a variety of FCS related industry equipment/software.

FCS Examples
✓ Process Skills

Personal Considerations?
STEM success requires--

Guide to Goals After Graduation--STEM Edition
www.G3Guides.com

Randel, grandel@ksde.org
✓ Process Skills
✓ Personal Considerations

STEM Processes?
STEM Education is....

- iSTEM
- Career Specific
- Academic Knowledge
- Thinking/Reasoning
- Instructional Strategies
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Connections:
National Programs
Competitive Events
Plan Process
Leadership/Service

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✓ Plan Process Practice
✓ Leadership & Teamwork Skills
✓ Industry Supported
✓ FCS Aligned

✓ Real Word Applications
✓ Authentic Experiences and Assessments
STEM Processes:
- Frame a problem
- Brainstorm solutions
- Test method
- Gather data
- Assess results

Planning Process
- Identify a concern
- Set a goal
- Form a plan
- Implement the plan
- Evaluate

HOW? Use Venn Diagram

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Audience Participation
Review
Discuss
Report

1. Review
2. Analyze for STEM
3. Indicate*
Process Skills
Personal Considerations
STEM Processes

FCS/STEM Careers?
What are FACS related STEM jobs?
Build your future with O*NET OnLine.

Welcome to your tool for career exploration and job analysis!

O*NET OnLine has detailed descriptions of the world of work for use by job seekers, workforce development and HR professionals, students, researchers, and more!

What’s New?
New BLS projections and industry info in O*NET websites

Find It Now
at My Next Move

I want to be a...
Start the career you’ve dreamed about, or find one you never imagined.

Occupation Search | Keyword or O*NET-SOC Code:

Find Occupations | Browse groups of similar occupations to explore careers. Choose from industry, field of work, science area, and more.

Advanced Search | Focus on occupations that use a specific tool or software. Explore occupations that need your skills.

Crosswalks | Connect to a wealth of O*NET data. Enter a code or title from another classification to find the related O*NET-SOC occupation.

ATTN: VETERANS
Put your military skills and experience to work in civilian life. Learn how at:

The Green Economy is changing tasks, skills, and

CAREERS/OCUPATIONS
U.S. Department of Labor—STEM Occupational Divisions:

- Chemistry
- Computer Science
- Environmental Science
- Geosciences
- Life Sciences
- Mathematics
- Physics/Astronomy
FCS: An Important STEM Connection

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Chefs
Dietetic Technicians
FCS Teachers
Counseling Psychologists
Food Scientist
Dietitians & Nutritionists

CAREERS

Science
Technology
Engineering
Math

Family & Consumer Sciences

All FCS Careers are Based in....

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CONTENT KNOWLEDGE

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MORE FCS related STEM jobs?

Textile Designer

Home Technology Consultant

Resource Manager

Food Innovator

Sustainable/Green Living Environment Interior Designers

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✓ Process Skills
✓ Personal Considerations
✓ STEM Processes
✓ Careers

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Tactics, Tools & Strategies

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“Award Winning DVD’s and educational activities feature real girls and will energize your science, technology and engineering classes.”

Live Healthy: Science Cooks—Analyze nutritional content of family recipes to create/taste test healthier alternative.

Engineer it: Pedal Power—Engineer a bike to an ice cream maker and make ice cream.

Get Tech: High Tech Fashion—Design evening wear using circuits for LED/electroluminescent wire

Science: House Warming—Design home to control heat through window placement.

http://www.iwitts.org/store/retention-products/scigirls-videos#season2explore
Mobile Tools

- Videos
- Apps
- Games
- E-Books
- Assessments

http://21teach.com/
American Institute of Baking International
Applied Baking Science

--Cereal composition
--Components of wheat flours
--pH and TTA (Total Titratable acidity)
--Protein in flours
--Hand gluten washing
--Starches and gums
--Differences in Fats and Oils
--Chemical leaveners
--Yeast and gas production
Audience Participation

Nutrients for Plants and People
Recycle, Redesign, Reuse

http://www.eeweek.org/greening-stem-educator-toolkits

Educator Toolkits
“Engineering a Sustainable World” Toolkit
--Recycle and Redesign Component
  --Apparel Upcycle project
Grooming/Health

Featured Videos: (interviews)

Fragrances=Science and Creativity
http://www.youtube.com/watch?v=PQKfxAtPYlo&feature=player_embedded

Sunscreen, skincare and shampoo, on my!
http://www.youtube.com/watch?v=OkScqVilhAo&feature=player_embedded

Others:
“Watch and Learn”—video’s and blogs
“Opportunities and Careers”—Career Personality Quiz
Incorporate Technology

“Empowering girls in science, technology, engineering and math”

“For Educators” section—Curriculum, Weekly hands-on

- Learn about game design and make up a board game to play.


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Nutrition

Divisions related to FCS:

Humans & Health—Science in Health
Life—Living Sciences

Nutrition Research:

Conducting Research—Use industry terms

https://student.societyforscience.org/glossary-research-terms
What future connections do you see for Family and Consumer Sciences?

What societal problems will we need to address?
Predict FUTURE needs for FCS Education.
Sustainable Living

Consumer Demand

Water Use Habits

Urban Gardens/Food Preservation

Redesign/Recycle/Upcycle
Audience Participation
What is the key to making a FCS lesson a FCS/STEM lesson?
8 Keys to STEM

- SCIENCE
- TECHNOLOGY
- Engineering
- MATH
- iSTEM
- Project/Problem
- STEM Literacy
- Real World
Are these good FCS examples of STEM education?

- **Science** — Food Science problem based labs; Problem-based Nutrition labs (students find the answer)
- **Technology** — Access to and use of a variety of FCS career related industry equipment/software
- **Engineering** — Solving real life problem; Writing technical manuals on how to complete a task
- **Math** — Recipe conversation for quantity cooking; Case studies in which practical problem solving have no one answer and requires justification
- **iSTEM** — Problem based activities which require multiple disciplines to solve.
- **Project Based** — Class projects completed in teams in FCS courses; FCCLA STAR Event Projects
- **STEM Literacy** — Relationship Education; FCCLA team work

STEM and FCS Connections; G. Randel, July, 2015. glrandel@yahoo.com
Investigation
Forensic Science

We’re Kalia and Carolyn. Carolyn’s sister Lizzy was about to celebrate her birthday when a crime took place. Somebody trashed Lizzy’s party set-up! We found traces of fingerprints, hairs and fibers, and even spit (gross!). We wondered how we could analyze the hairs to identify the culprit. Our question: How can we match the hairs from a crime scene to one of our suspects?

For each group of 4 girls, you’ll need:

- a laser pen and laser safety goggles
- stiff construction paper or a Manila folder
- white office paper
- scissors
- calcite or masking tape
- a marking pen
- a meter stick or standard carpenter’s tape measure
- a centimeter ruler
- a dimly lit room
- a notebook

Find out more about Carolyn and Kalia’s investigation at pbskids.go.org/dragonflytv/show/forensics.html

Check out this investigation on the SciGirls DVD. Select “Forensic Science” from the main menu.
You now have the floor!
FCS Education STEM strategies

Math and Science:
-- STEM occurs after basics skills
-- Problem based
-- STEM Literacy

iSTEM:
-- Multi-disciplinary
-- Project/Problem based/Inquiry focus

STEM Literary
-- Thinking/Reasoning
-- Collaboration
-- Creativity
-- Problem Solving

Real World:
-- FCCLA Competitive Events
-- Practice Applications
STEM Isn’t…

• Low level basic math or science
• Limited to just Science, Technology, Engineering and Math classes
• Only high skill scientists and engineers.
• Separate academic fields, but includes STEM literacy and iSTEM career in focus.

STEM is…

• Project/problem based real world applications of math and science
• Linked to FCS content just as it is Agriculture and Health
• Linked with a need for technicians and innovators
• Family and Consumer Sciences which started from, and remains today, foundational STEM.

STEM and FCS Connections; G. Randel, July, 2015. glrandel@yahoo.com
Encourage female STEM professionals

Early Child Connections

Early STEM Skills
Now, it’s up to you...

Six Tips for “STEMifying” FCS Lesson Plans (Handout)
Keys to Connecting to STEM SuccessFully:

- Teach FACS methodology (problem based, inquiry based).
- Stress process skills development (without assumption).
- Build leadership (taking responsibility) and teamwork (collaboration) continually.
- Point out STEM connections to students (use correct terminology).
- Connect FCS occupations to STEM (www.onetonline.org).
- Look to FCCLA for resources.
- Share connections with administration to ensure you are at the STEM table.
- Link your classroom experiences with other STEM efforts.
- Share your ability to address diversity/gender STEM needs.

FCS: An Important STEM Connection, G Randel, grandel@ksde.org
Family & Consumer Sciences:

A VERY Important STEM Connection
Other References/Resources:

• American Institute of Baking https://www.aibonline.org//

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• Research Terms: https://student.societyforscience.org/glossary-research-terms
• Science Terms: www.undsci.kerkely.edu/glossary/glossary.php
• Math Terms: www.math.com/school/glossary/glossindex.html