

A BAKER'S DOZEN Labs



LIVE.
LEARN.
BAKE!

A Baker's Dozen Labs

by

Home Baking Association

Copyright ©2023 by Home Baking Association
Digital Version

Home Baking Association

HomeBaking.org

Acknowledgements

With special thanks and recognition to *A Baker's Dozen Labs* writers, pilot lab testing, copy editors and development:

Home Baking Association (HBA) staff:

- Sharon Davis, HBA Program Development Director, Family & Consumer Sciences (FCS) Education, Luckey Jr. High, Kan.
Principle copy writer, lab research and development; classroom testing
- Charlene Patton, HBA Executive Director, FCS Foods and Nutrition in Business
Production coordinator

Connie Nieman, FCS Baking Science teacher (retired), Olathe North High School, Kan., HBA 2006 Educator Award Winner

Pilot and current lab research, testing, Kansas Baking, HBA baking workshops instructor and Pastry Science curriculum development

Kansas Wheat Commission; Pilot lab funding, teacher training workshop support

Ellen Josephsen, *A Bakers Dozen Labs* design

Home Baking Association members contributed content, with additional editing and resources from:

- Samantha Kelly, Consumer Test Kitchen, *Land O'Lakes Dairy Foods*
- Linda Nelsen, Kelly Olson, Consumer Affairs, *LeSaffre Yeast Corporation*
- Cindy Falk, FCS Nutrition Educator, *Kansas Wheat Commission*
- Eleonora Lahud, Chef, *C&H Sugar, Domino Sugar (ASR Group)*
- Courtney Gaine, PhD and Maria Osterhaus Scott, MPH, *The Sugar Association*
- Stephanie Petersen, Research Chef, *Panhandle Milling Company*
- Kristin Hoffman, Chef, BakerBettie.com
- Gemma Stafford, Chef, BiggerBolderBaking.com
- Robert Harper, President, *Hopkinsville Milling Company*

Kansas State University student interns, 2018:

- Kyle Johnson, Food Science major – review of technology links
- Taylor Spangler, Family & Consumer Sciences Education major – Education standards crosswalk; STEAM and P21 Framework connections

A special thanks for photos and images provided by our HBA members throughout the labs, resources and glossary.



Dear Educator:

Welcome to *A Baker's Dozen Labs!*

What do you get when you blend veteran food, culinary, and hospitality educators, test kitchen science, technology, artisan skills, premium ingredients, farmers, millers, and students?

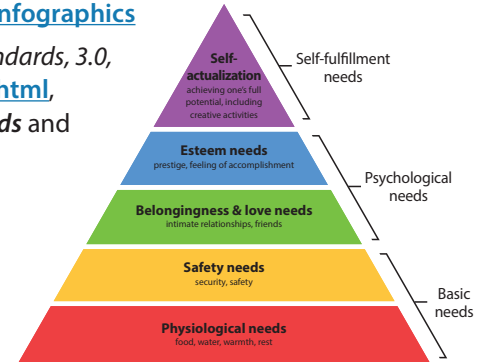
Answer: Standing room only.

A Baker's Dozen Labs integrate outcomes essential to food, culinary, and hospitality careers with the health and well-being of individuals, family life, and communities. HBA surveys indicate students frequently apply these skills at home and in their communities. Take time to review PowerPoint presentations *Bake to Build Bridges Home to Careers* homebaking.org/powerpoint and *Infographics*, homebaking.org/infographics

A Baker's Dozen Labs focuses on achieving *Family and Consumer Sciences National Standards, 3.0, 2018* and Framework for FCS Career and Technical Education, leadfcsed.org/develop.html, research-based foods goals for adolescents—starting with *Maslow's Hierarchy of Needs* and including:

“Studies indicate: Fewer cooking skills equate with low availability and accessibility of nutrient dense foods. Direct, repeated culinary experiences impact food preferences and acceptance.”

Call for Culinary Skills Education in Childhood Obesity-Prevention Interventions. Nelson, S; Corbin, M. PhD; Nickols Richardson, PhD, RD. Journal of the Academy of Nutrition & Dietetics. August 2013 Vol 113: 8; 1031-1036.



Standing Room Only

“I had to share our Family & Consumer Sciences Baking Science class numbers. We are a 9-12 high school with 2000+, but the Baking class numbers more than doubled at my school.

For 2010 to present, we've had 400 students sign up for the Baking classes, with 200 more students signing up for Baking class as an alternate.

Each of our five high schools offers baking science as 0.5 Science credit, Grades 9-12, and has had similar numbers.

Connie Nieman, FACS Baking and Food Science Courses, Olathe North High School, Kan.

Doctors desire food education partners: “Many children have never seen their parents produce a meal, speed or scratch... If children are raised to feel uncomfortable in the kitchen, they will be at a disadvantage for life.”

Journal of the American Medical Association. 2010. Lichtenstein, A; Ludwig, D 303(21):2109A

“To improve dietary intake, interventions among young adults should teach skills for preparing quick and healthful meals...Dietetics professionals should encourage parents to involve their adolescents in food-related tasks to help them develop the proficiencies they need as young adults to maintain a healthful diet.”

Larson, N, Story, M, Eisenberg, M, Neumark-Sztainer, D., 2006, Food preparation and purchasing roles among adolescents. Journal of the American Dietetics Association. 106(2), 211-219

“Studies have shown that cooking skills lead to increased cooking frequency, improved knowledge, preferences, and self-efficacy toward and interest in cooking, and decreased food costs.”

Cooking Classes Outperform Cooking Demonstrations for College Sophomores. Levy, Joshua, MS; Auld, Garry, PhD. RD. J Nutri Educ Behav. 2004;36:197-203.

“Children learn lifetime skills through practicing basic math skills such as counting, weighing, measuring, tracking time; they also gain social skills by working together and communicating in the kitchen.”

Cooking with Kids in School: Why It Is Important. Mary Ann McFarland, VA Polytechnic Institute & State University, SW District Extension Office. June 12, 2019 Retrieved 9/18/23 healthy-food-choices-in-schools.extension.org/cooking-with-kids-in-schools-why-it-is-important

With appreciation,

Sharon Davis

HBA Program Development Director
Family & Consumer Sciences Education

Charlene Patton

HBA Executive Director
FCS Foods & Nutrition in Business



Table of Contents

Lab 1: Why Bake?	1-10
Introduction, Terms & Techniques, Experiential Learning	2
For Teacher, A-B-C's for Baking Educators, Outcomes	3
Take 10 Skill Drills, Computer Lab: Baking Temperatures	4
Baking Labs: Strawberry Muffin Tops	5
Lab 1 Fresh is Best, Lab 2 Celebrate!	6
Lab 3 Nutrition Plus!, Lab 4 Going Green	7
Lab 5 Baking for Special Dietary Needs	8
Gluten-Free Substitutions	8
Consumer Sensory Evaluations: A Matter of Taste, Critical Thinking: Consumer Science, Costs & Benefits	9
Local Connections: Get to Know a Baker, Matter of Taste Evaluation Form	10
Lab 2: Getting Started	11-19
Introduction, Outcomes, Terms and Techniques	12
For Teacher, Baking Science Lab: Ingredient Functions, Computer Lab: Do-It-Yourself Baking Topics	13
Take 10 Skill Drills, Critical Thinking: Granola	14
Baking Labs	
First Experience: Great Grains Granola (About Real Vanilla; How to Toast Nuts)	15
Intermediate Experience: Carrot Streusel Coffee Cake (Coffee Cake Innovations)	16-17
Advanced Experience: 100% Whole Grain Trail Mix Bars (About Baker's Percentage)	18-19
Critical Thinking: Breakfast & Morning Nutrition, Computer Lab: What is Whole Grain?, Meet Farmers	16
Critical Thinking: Granola Trail Mix Bars, Breakfast Cookies, Local Connections: Conduct a Consumer Taste Test	18
Lab 3: Wheat Flour and Cornmeal...The Staff of Life	20-38
Introduction, Terms & Techniques, Outcomes	21
Wheat and Corn Timeline, For Teacher	22
Take 10 Skill Drills, Computer Lab: Field to Flour video, Where are Grains Grown or Milled?	23
Grain Websites Worksheet	24
Baking Science: Flour is NOT Just Flour, Supermarket Flour and Cornmeal, Label Savvy Skill Builder	25
The Scoop on Baking Flours, For Teacher, Whole Grain Stamps, Whole Wheat Kernel	26
Baking Science Lab: Flour Absorption and Gluten Development	27
Flour Chart: Wheat Classes (Need-to-Know Flour Basics, Self-Rising Flour & Cornmeal, Gluten-Free Flour)	28
Baking Labs	
First Experience: Everyday Muffins, Critical Thinking: Alternative Flours Baking Lab option	29-30
Intermediate Experience: English Muffin Batter Bread, Critical Thinking: Alternative Flours Baking Lab	31-32
Alternative Flours Baking Lab Worksheet	33
Lab Rubric, A Matter of Taste Lab Evaluation Form	34
Advanced Experience: Pilgrim Bread, Critical Thinking: Short Lab Times options	35-36
Local Connections: Add-a-Whole Grain Signature Bread, Best-Ever Cornbread (EXTRA: Bread in a Bag resources)	37
What Happened to the Yeast Bread?	38

Table of Contents

Lab 4: Creating Lift with Chemical Leavening	39-49
Introduction, For Teacher, Outcomes, Leavening Timeline	40
Take 10 Skill Drills, Terms & Techniques	41
Computer Lab, Leavening Notes and Substitutions, Muffin Methods from the Pros	42
Baking Science Experiment: How Fast Do Chemical Leaveners Work?, Critical Thinking, Observation Chart	43
Baking Labs	
First Experience: Pumpkin Pancakes (Function of Leavening, Critical Thinking, About Pumpkin)	44-45
Intermediate Experience: Apple Cheese Muffins	46
Advanced Experience: Berry Banana Bread (Critical Thinking: Whole Grain Label Stamps)	47-48
Critical Thinking: Berry Banana Bread Costing, Local Connections: Book and Bake <i>The Pumpkin Runner</i>	49
Lab 5: Flavor Factor...Fats	50-60
Introduction, Terms & Techniques, Outcomes, Fats Used in Baking	51
For Teacher, Test Your Baking Fat IQ, Baking Functions of Fat, Baking Fat History, Take 10 Skill Drills	52
Computer Lab, Critical Thinking, Bakers' Pastry & Pie Notes, 3-2-1 Pastry Ratio	53
Baking Science Lab: Tenderizing Effects of Fats, Cinnamon Crisps, Lab Chart	54
Baking Labs	
First Experience: Light and Fluffy Biscuits (Chef Donley on Biscuits, History, Self-rising Flour)	55-56
Intermediate Experience: Designer Scones (Food History: Bannock)	57-58
Advanced Experience: Blue Ribbon Apple Pie	58-59
Biscuit and Scone Evaluation Rubric, Critical Thinking	58
Local Connections: Host a Coffee House, Consumer Science Marketing Lab	60
Lab 6: The Amazing Power Plant—Yeast	61-73
Introduction, Yeast History, Terms & Techniques, Outcomes	62
For Teacher, Take 10 Skills Drills: Sourdough	63
Computer Lab, Baking Science: The Science of Yeast	64
Critical Thinking	65
Baking Labs	
First Experience: Pizza Tonight! (Gluten-Free Pizza Crusts, Mozzarella Mash, Par-baked Crusts)	65-66
Intermediate Experience: Focaccia (Artisan Focaccia, Gluten-Free, Cracker Bread)	67-69
Advanced Experience: Hearth Bread	70-71
Critical Thinking: Pizza	67
Critical Thinking: Focaccia, Parmesan Cracker Bread	69
Local Connections: Share a Loaf, More Hearth Breads, Artisan Stenciling, Wheat Bread Bowls	72
Critical Thinking, Yeast Bread Baking Assignment: Write a RAFT About Yeast	73

Table of Contents

Lab 7: Sweet! Baking Sugars 74-85

Introduction, Caloric and Non-caloric Sweeteners, Terms & Techniques	75
Baker's Notes, For Teacher: Sugar's Roles and Functions, Outcomes	76
Take 10 Skill Drills, History: Sugar's Path to the Americas, Computer Lab.....	77
Baking Science Lab: Cookie Science, Thin, Crisp Chewy (Whole Wheat Sugar Cookie), Cookie Lab Chart.....	78-79
Baking Labs	
First Experience: Low-Fat Spice Snack Cake (Sweet Tea Party, Smart Snacks)	79-80
Intermediate Experience: Quilt Cake (Designer Colored Sugars palette)	81-83
Advanced Experience: The Great American Cinnamon Roll.....	83-84
Critical Thinking	81
Computer Lab, Critical Thinking: Decorating a Quilt Cake.....	83
Cinnamon Roll Creative Options, Critical Thinking, Local Connections: Discover Community Around You	85

Lab 8: Eggs..... 86-97

Introduction, For Teacher, Outcomes, Egg History Timeline.....	87
Egg Baking Functions, Computer Lab, Take 10 Skill Drills, Terms & Techniques	88
For Teacher, Baking Science Lab: Egg Substitutes—Do They Work? (Banana Cupcakes, Egg Substitutes Chart, Poster, Rubric) ...	89-90
Baking Labs	
First Experience: A+ Breakfast Crepes, Critical Thinking (Dutch Baby, Three Berry Filling, Gluten-Free)	91-92
Intermediate Experience: Forgotten Chocolate Chip Cookies (Baker's Notes, Meringue, Angel Food, Vanilla).....	93-94
Advanced Experience: Ozark Pudding (Toasted Black Walnuts, Egg Custard Tarts)	95-96
Critical Thinking: Crepes.....	91
Critical Thinking: Meringues.....	93
Critical Thinking: Ozark Pudding, More Great Desserts (Custard Tarts, Calabrian Black Walnut Cake: Pavlova)	95
Local Connections: Bakers Lend a Humane Hand (Hand-Baked Gourmet Pet Treats)	97

Lab 9: Liquids..... 98-112

Introduction, Outcomes, Terms & Techniques	99
For Teacher, Take 10 Skill Drills, Computer Lab, Functions of Liquids in Baking, Customizable Quick Breads.....	100
Liquids in Baking: Percent Liquid in Fruits, Veggies, Fats (Best Apples for Baking)	101
Baking Guidelines for Value-Added Ingredients	102
Baking Science Lab: Why Do Bakers Condition Raisins?, Critical Thinking: Oatmeal Raisin Cookies	103-104
Baking Labs	
First Experience: Perfect Muffins (Muffin Baking Tips, Test Kitchen Muffin Variations).....	104-105
Intermediate Experience: Zucchini Bread (For Teacher, Chocolate Zucchini Bread)	106-107
Advanced Experience: Baking Science: Everyday Milk Potato Bread (Deli Buns: Short Lab Option)	108-110
Baking Science Lab: Why Scald Milk?, Temperatures, Gluten Window	108-109
Critical Thinking: Liquid Variables (Liquid to flour ratios for batter and dough).....	106
Critical Thinking: Zucchini Bread, Test Kitchen Variations	107
Critical Thinking: Everyday Milk Bread, Local Connections: Uncover Local Baking Traditions, Cultures	111
Baking Traditions: Applesauce Cake, Grandma Sadie's Farmhouse Black Walnut Sweet Bread	112

Table of Contents

Lab 10: The Savor of Salt 113-126

Introduction: Salt and Life, Terms & Techniques, Let's Hear It For Salt	114
Baking Functions, Outcomes, For Teacher	115
Take 10 Skill Drills, How the Tongue Tastes, Computer Lab: See the Salt Sites	116
For Teacher, Baking Science Lab: Reducing Sodium Challenge, Crispy Cheese Crackers, Cracker Rubric	117-118
Baking Labs	
First Experience: Sweet or Savory Bread Sticks (Baker's Note: Self-rising Flour)	119-120
Intermediate Experience: Pita Bread (Simple Hummus, Pita Chips)	121-123
Advanced Experience: Soft Pretzels (History, Critical Thinking)	124-125
For Teacher, Critical Thinking: Bread Stick Nutrients and Value	121
Evaluation Rubric, Critical Thinking: Pita, Consumer Science	123
Local Connections: Baking for Special Needs, Gluten-Free Pretzel Bites, Careers	126

Lab 11: Chocolate 127-139

Introduction, Chocolate Timeline, Terms & Techniques	128
For Teacher, A-B-Cs of Cocoa, Outcomes, About Cacao and Chocolate	129
Take 10 Skill Drills, Computer Lab, Build Your Chocolate IQ	130
Baking Science Lab: Compare Hot Chocolate in History	131-132
For Teacher, Critical Thinking: Hot Chocolate Sweetness, Mixes	132
Baking Labs	
First Experience: Chocolate Chip Sheet Cake (Test Kitchen Variation: Double Chocolate, Critical Thinking)	132-133
Intermediate Experience: Espresso Brownie Cookies (Critical Thinking, Food History, Chocolate Crinkle Cookies)	134-135
Advanced Experience: Molten Chocolate Cake (Critical Thinking, Molten Lava Cakes)	136-137
Local Connections: Bake-Your-Best Brownie Benefit, Chocolate Mountain Brownies	138
A Slice of Chocolate History, Chocolate Yeast Cake (Chocolate Bread and Dessert Specialties)	139

Lab 12: Dough Sculpting 101 140-152

Introduction, Traditional Breads, Terms & Techniques, Computer Lab	141
For Teacher, Outcomes, Dough Sculpting Time-Saving Techniques	142
Skill Building Play Clay Dough, Take 10 Skill Drills	143
Baking Lab: Dough Sculpting (Rolls, Shapes, Braids), Refrigerator Potato Dough, Cheese-Filled Sweet Lattice Braid	144-149
Tips for Success, Bread Stenciling	146
Cookie Sculpting (Huge Scary Spiders, Favorite Teddy Bears)	150
Local Connections: Shape Up! Your Food Enjoyment Factor, Double the Learning: Book and Bake	151
Bread with a Twist: Soft Pretzels, Critical Thinking: Soft Pretzels (Everything Bagel Pretzels)	152

Table of Contents

Lab 13: A Baker's Pantry of Resources 157-163

Introduction, Outcomes, Terms & Techniques	154
For Teacher, Baking Food Safety, Food Label Dates, Take 10 Skill Drills.....	155
Baking Ingredient and Product Storage-at-a-Glance (Pantry, Refrigerated, Frozen)	156
Frozen Baked Goods Guide.....	157
Resources and References.....	158
HBA Member and Partner Baking Educator Resources	
Baking, History and Science.....	158-159
Book and Bake	160
Baking News	161
Partners for Human and Online Resources.....	161
Get the Flour in the Bowl: Tools and Resources for Baking with Young and New Bakers	162
Red Star Yeast Resources for Educators.....	163

Appendix, Section 1 1-11

National FCS Standards, 3.0, 2018 achieved by <i>A Baker's Dozen Labs</i>	
(1) Overall content standards and competencies achieved by labs.....	2-5
(2) Individual lab standards and competencies crosswalked.....	5-8
Connections to STEAM (Sciences, Technology, Engineering, Art, Math).....	9
P21 Framework Connections	10-11

Baking Glossary of Terms & Techniques www.homebaking.org/glossary

Baking ingredient, tools and method definitions, resource links, videos and illustrations- A to Z.



Appendix, Section 2

Baking Lab and Teaching Resources 12-67

<i>Copy-ready forms, rubrics, worksheets, answer sheets, guides, infographics</i>	
A Kernel of Wheat.....	12
A Matter of Taste.....	13
Artisan Bread in Five Minutes a Day.....	14-15
Artisan Focaccia	16-17
Artisan Sourdough Bread	18-20
Baking Food Safety 101	21
Baking Food Safety Mug Muffin Lesson.....	22
Baking Temperatures	23
Baking Ingredient One-Pager.....	24
Baking Lab Equipment List	25
Baking Lab Rubric.....	26
Baking Measurements & Substitutions	
Dry Ingredients	27
Liquid Ingredients, Converting Between English and Metric	28
Ingredient & Pan Substitutions.....	29
Ingredient Equivalents.....	30
Baking Skills Checklist.....	31
Baking Works: Your Guide to a Career in Baking	32
Baker Word Search.....	33
Baker Word Search Answer Key.....	34
Baking Word Power	35
Baking Word Power Answer Key	36

Table of Contents

Bread Baking Pre-test	37
Bread Baking Pre-test Answer Key	38
C&H Baking Guide	39
Cause & Effect	40
Cause and Effect Answer Key	41
Chain of Events Mise en Place Cracker Lab Worksheet	42
Chain of Events Mise en Place Cracker Lab Seeded Crackers	43
Chocolate Tasting Steps	44
Chocolate Tasting Chart	45
Count the Costs	46
Crispy Herb Crackers	47
Create a Food Label	48
Customizable Quick Bread	49
DIY Baking Topics Rubric	50
Domino Baking Guide	51
Egg Substitutes	52
Educator Baking Award	53
Flour 101	54
Flour Food Safety: Did you know Flour is a Raw Ingredient?	55
Flour Food Safety: Did you know Flour is a Raw Ingredient? Spanish	56
Foldables	57
Gluten in the Diet	58
HBA Order Form	59-60
Homemade Pizza vs. Takeout	61
How Flour is Milled	62
Measure UP!	63
Measure UP! Answer Key	64
<i>Mise en place</i> Chart	65
Red Star Yeast Resources for Educators	66
Safe Kitchen Checklist	67
Science of Milling	68
6 Classes of Wheat	69
Sugar's Functional Roles	70
Supplies Order Form	71
Tea Party Baking Vocabulary Strategy	72
Temperatures for Yeast Bread Production	73
3-2-1 Pie Pastry	74-75
Washing Hands	76
Ways to Make Listening Easier	77
What Happened to the Yeast Bread?	78
What's the Difference Between Baking Powder and Soda?	79
What is Gluten?	80
Wheat: An Essential Grain	81
Whole Grain Baking 101	82
Why Bake with Glass?	83
Yeast Bread Handling and Storage	84
Yeast Temperature and Fermentation Experiment	85
Yeast Production Diagram	86
Yeast Temperature RAFT	87



Home Baking Association
Providing Tools and Knowledge to Perpetuate Generations of Home Bakers

HOME ABOUT ▾ LEARN ▾ GLOSSARY VISUALS ▾ MEMBERS ▾ RECIPES ▾ SHOP NEWSLETTER ▾

Flour & Baking Food Safety

Safe steps in food handling, cooking & storage

Ingredient and Process Temperatures		
Cutting in Butter	25-40°F	32-43°C
Coating Butter	65-75°F	18-23°C
Browning Sugar Toppings (Baker's Temp)	32-100°F	0-38°C
Browning Dry Molasses (Baker's Temp)	160-170°F	70-78°C
Hard-Boil Bread (Baker's Temp)	160-170°F	70-78°C
Stough Proofing (Proof Box Temp)	80-85°F	27-30°C
Stough Proofing (Room Air Humidity)	80-90%	
Doneness Temperatures		

Check Your Altitude
Doneness temperatures are affected by altitude. For more information on how to adjust your recipes, visit www.homebaking.org.

Food Safety
Cook, Dry, Compress & Document
Home Education, HomeBaking.org

The Home Baking Association (HBA) mission of "growing the practice of home baking" could not be more timely due to economic conditions and other societal changes. The fact is more meals are being prepared at home, and this organization is at the forefront in sharing our tools and knowledge to not only current bakers, but future generations as well. In recent years more people learned about HBA than ever before, keeping the momentum of this non-profit organization going strong.

1-2-3 Baking Resources

1. Find many more free and at-cost resources from HomeBaking.org/Members
2. Receive monthly baking resources and news! [Sign up](#) for our e-newsletter or view the archives, homebaking.org/newsletter
3. Check out the HBA Blog, homebaking.org/blog, or follow us on Facebook, Instagram, Pinterest, Twitter and YouTube.



Pita Success! Baking STEAM workshop, Spokane Wash.

A Baker's Dozen Labs



Education Connections

- National Family and Consumer Sciences (FCS) Standards 3.0
- Sciences, Tech, Engineering, Art and Math (STEAM)
- P21 Framework for 21st Century Learning

Connections researched and provided by:

- Taylor Spangler, Kansas State University Family and Consumer Sciences Education, 2018
- Sharon Davis, FCS Education, Home Baking Association, HomeBaking.org

The FCS National Standards are expanded below for reference. Following these, the standards are cross-referenced within each lab.

- Source: Leading, Engaging, Advocating, Developing—Family & Consumer Sciences Education, 2018. Family and Consumer Sciences National Standards 3.0, leadfcsed.org/national-standards.html
- Source: Family, Career and Community Leaders of America (FCCLAinc.org) program initiatives: Career Connections, Families First, Financial Fitness, Power of ONE, and Student Body, may be integrated using the Local Connections in each lab.

1.0 – Career, Community and Family Connections

Content Standard 1.1 — Analyze strategies to manage multiple roles and responsibilities (individual, family, career, community, and global).

Competencies:

- 1.1.4 – Analyze potential effects of various career path decisions on balancing work and family.
- 1.1.5 – Determine goals for life-long learning and leisure opportunities for all family members
- 1.1.6 – Develop a life plan, including pathways to acquiring the knowledge and skills needed to achieve individual, family, and career goals

Content Standard 1.2 — Demonstrate transferable knowledge, attitudes, and technical and employability skills in school, community and workplace settings.

Competencies:

- 1.2.1 – Analyze potential career choices to determine the knowledge, skills, attitudes, and opportunities associated with each career.
- 1.2.3 – Apply communication skills in school, community and workplace settings
- 1.2.4 – Demonstrate teamwork skills in school, community and workplace settings
- 1.2.6 – Demonstrate leadership skills and abilities in school, workplace and community settings
- 1.2.8 – Demonstrate employability skills, work ethics, and professionalism.

Content Standard 1.3 – Evaluate the reciprocal effects of individual and family participation in community and civic activities

Competencies:

- 1.3.1 – Analyze goals that support individuals and family members in carrying out community and civic responsibilities
- 1.3.2 – Demonstrate skills that individuals and families can utilize to support civic engagement in community activities.
- 1.3.6 – Identify ways individuals and families can influence change in policies, agencies, and institutions that affect individuals and families.

2.0 – Consumer and Family Resources

Content Standard 2.1 — Demonstrate management of individual and family resources such as food, clothing, shelter, health care, recreation, transportation, time, and human capital.

Competencies:

- 2.1.1 – Apply time management, organizational, and process skills to prioritize tasks and achieve.
- 2.1.2 – Analyze how individuals and families make choices to satisfy needs and wants.
- 2.1.3 – Analyze decisions about providing safe and nutritious food for individuals and families

Content Standard 2.2 — Analyze the relationship between the global environment and family and consumer resources

Competencies:

- 2.2.1 – Analyze individual and family responsibility to the environment trends and issues
- 2.2.2 – Summarize environmental trends and issues affective families and future generations
- 2.2.3 – Demonstrate behaviors that conserve, reuse, and recycle resources to maintain the environment.

3.0 – Consumer Services

Content Standard 3.5 — Demonstrate skills needed for product development, testing, and presentation.

Competencies:

- 3.5.1 – Conduct market research to determine consumer trends and product development needs.
- 3.5.2 – Design or analyze a consumer product.
- 3.5.3 – Analyze feature, prices, product information, styles, and performance of consumer goods for potential global impact and trade-offs among the components.
- 3.5.4 – Evaluate a product utilizing valid and reliable testing procedures.

- 3.5.5 – Apply statistical analysis processes to interpret, summarize, and report data from tests.
- 3.5.6 – Evaluate labeling, packaging, and support materials of consumer goods.
- 3.5.7 – demonstrate a plan to educate and audience about a new product on the consumer market.
- 3.5.8 – Utilize appropriate marketing and sales techniques to aid consumer in the selection of goods and services that meet consumer needs.

4.0-Education and Early Childhood

Content Standard 4.3 — Demonstrate integration of curriculum and instruction to meet developmental needs and interests of children, youth and adults, considering gender, ethnicity, geographical, cultural, and global influences.

Competencies:

- 4.3.1 – Analyze a variety of curriculum and instructional models.
- 4.3.2 – Implement learning activities in all curriculum areas that meet developmental needs of learners.
- 4.3.3 – Implement an integrated curriculum that incorporates a learner’s language, learning styles, early experiences, and cultural values.
- 4.3.4 – Demonstrate a variety of teaching methods to meet individual needs of learners.
- 4.3.5 – Arrange the classroom environment to provide for learners’ exploration, discovery, development, and reflection through multiple methods including learning centers.
- 4.3.6 – Establish effective activities, routines, and transitions for various age groups.

Content Standard 4.4 — Demonstrate a safe and healthy learning environment for children, youth and adults.

Competencies:

- 4.4.1 – Manage physical space to maintain a learning environment that is safe and healthy and encourages physical activity.
- 4.4.2 – Apply safe and healthy practices that comply with local, state, and federal regulations to assure learners’ safety.
- 4.4.3 – Implement strategies to teach health, safety, and sanitation habits.
- 4.4.4 – Plan safe and healthy meals and snacks that meet USDA standards.

Content Standard 4.5 — Demonstrate skills for building and maintaining positive collaborative relationships with children, youth and adults in their family and community environments, considering gender, ethnicity, geographical, cultural, and global influences.

Competencies:

- 4.5.1 – Apply developmentally appropriate and culturally responsive guidelines for behavior.
- 4.5.2 – Demonstrate problem-solving and decision-making skills working with children, youth and adults.
- 4.5.3 – Demonstrate interpersonal skills that promote positive and productive relationships with learners.
- 4.5.4 – Implement strategies for constructive and supportive interactions between children, youth and adults and their families and communities.

8.0 – Food Production and Services

Content Standard 8.1 — Analyze career paths within the food production and service industries.

Competencies:

- 8.1.1 – Explain the roles, duties, and functions of individuals engaged in food production and services careers.
- 8.1.2 – Analyze opportunities for employment and entrepreneurial endeavors.
- 8.1.3 – Summarize education and training requirements and opportunities for career paths in food production and services.

Content Standard 8.2 — Demonstrate food safety and sanitation procedures.

Competencies:

- 8.2.1 – Identify characteristics of major foodborne pathogens, their role in causing illness, foods involved in outbreaks, and methods of prevention.
- 8.2.3 – Use knowledge of system to document, investigate, report, and prevent foodborne illness.
- 8.2.5 – Practice standard personal hygiene and wellness procedures.
- 8.2.6 – Demonstrate proper purchasing, receiving, storage, and handling of raw and prepared foods.
- 8.2.7 – Demonstrate safe food handling and preparation techniques that prevent cross contamination from potentially hazardous food and food groups.
- 8.2.8 – Analyze current types of cleaning and sanitizing materials for proper use.
- 8.2.11 – Demonstrate ability to maintain necessary records to document time and temperature control, HACCP, employee health, maintenance of equipment, and other elements of food preparation, storage, and presentation.

Content Standard 8.3 — Demonstrate industry standards in in selecting, using, and maintain food production and food service equipment

Competencies:

- 8.3.1 – Operate tools and equipment following safety procedures and OSHA requirements.
- 8.3.2 – Maintain tools and equipment following safety procedures and OSHA requirements.
- 8.3.3 – Demonstrate procedures for cleaning and sanitizing equipment, serving dishes, glassware, and utensils to meet industry standards and OSHA requirements.
- 8.3.5 – Demonstrate procedures for safe and secure storage of equipment and tools.
- 8.3.6 – Identify a variety of equipment for food processing, cooking, holding, storing, and serving.

Content Standard 8.4 — Demonstrate menu planning principles and techniques based on standardized recipes to meet customer needs

Competencies:

- 8.4.2 – Apply menu-planning principles to develop and modify menus.
- 8.4.3 – Analyze food, equipment, and supplies needed for menu production.
- 8.4.6 – Record performance of menu items to analyze sales and determine menu revisions.
- 8.4.7 – Apply principles of measurement, portion control, conversions, food cost analysis and control, menu terminology, and menu pricing to menu planning.

Content Standard 8.5 — Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.

Competencies:

- 8.5.1 – Demonstrate professional skills in safe handling of knives, tools, and equipment.
- 8.5.2 – Demonstrate professional skill for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising, stewing, poaching, steaming, and baking using professional equipment and current technologies.
- 8.5.3 – Demonstrate knowledge of portion control and proper scaling and measurement techniques.

- 8.5.4 – Apply the fundamentals of time, temperature, and cooking methods of cooking, cooling, reheating, and holding a variety of foods.
- 8.5.5 – Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
- 8.5.6 – Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
- 8.5.7 – Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
- 8.5.9 – Prepare sandwiches, canapes and appetizers using safe handling and professional preparation techniques.
- 8.5.10 – Prepare breads, baked goods and desserts using safe handling and professional preparation techniques.
- 8.5.11 – Prepare breakfast meats, eggs, cereals, and batter products using safe handling and professional preparation techniques.
- 8.5.12 – Demonstrate professional plating, garnishing, and food presentation techniques.
- 8.5.14 – Demonstrate cooking methods that increase nutritional value, lower calorie and fat content, and utilize herbs and spices to enhance flavor.

Content Standard 8.6 — Demonstrate implementation of food service management and leadership functions.

Competencies:

- 8.6.1 – Apply principles of purchasing, receiving, and storing in food service operations.
- 8.6.2 – Practice inventory procedure including first in/first out concept, date marking, and specific record keeping.
- 8.6.8 – Implement marketing plans for food service operations.

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2 — Apply risk management procedures to food safety, food testing, and sanitation.

Competencies:

- 9.2.1 – Analyze factors that contribute to food borne illness.
- 9.2.2 – Analyze food service management safety and sanitation programs.
- 9.2.5 – Demonstrate practices and procedures that assure personal and workplace health and hygiene.
- 9.2.6 – Demonstrate standard procedures for receiving, storage, and preparation of raw and prepared foods.
- 9.2.7 – Classify cleaning and sanitizing materials and their correct use.
- 9.2.9 – Demonstrate waste disposal and recycling methods.

Content Standard 9.3 — Evaluate nutrition principles, food plans, preparation techniques and dietary plans.

Competencies:

- 9.3.1 — Analyze nutrient requirement across the life span addressing the diversity of people, culture, and religions.
- 9.3.2 – Analyze nutritional data.
- 9.3.3 – Apply principles of food production to maximize nutrient retention in menus.
- 9.3.4 – Assess the influence of socioeconomic and psychological factors on food and nutrition and behavior.
- 9.3.5 – Analyze recipe/formula proportions and modification for food production.
- 9.3.6 – Critique the selection of foods to promote a healthy lifestyle.
- 9.3.7 – Plan menus, applying the exchange system to meet various nutrient needs.

Content Standard 9.4 — Apply basic concepts of nutrition and nutrition therapy in a variety of settings.

Competencies:

- 9.4.1 – Analyze nutritional needs of individuals.
- 9.4.5 – Design instruction on nutrition to promote wellness and disease prevention.

Content Standard 9.5 — Demonstrate use of science and technology advancement in food product development and marketing.

Competencies:

- 9.5.1 – Analyze various factors that affect food preferences in the marketing of food.
- 9.5.2 – Analyze data in statistical analysis when making development and marketing decisions.
- 9.5.3 – Prepare for food presentation and assessment.
- 9.5.4 – Maintain test kitchen/laboratory and related equipment and supplies.
- 9.5.5 – Implement procedures that affect quality product performance and sustainability.
- 9.5.6 – Conduct sensory evaluations of food products.
- 9.5.7 – Conduct testing for safety of food products, utilizing available technology.

Content Standard 9.7 — Demonstrate principles of food biology and chemistry.

Competencies:

- 9.7.1 – Explain the properties of elements, compounds, and mixtures in foods and food products.
- 9.7.2 – Analyze the effects of thermodynamics on chemical reactions in foods and food products.
- 9.7.3 – Explain the process of ionization in the formation of acids and bases and effect on food and food products.
- 9.7.4 – Explain the impact of molecular structure of simple and complex carbohydrates on digestion, nutrition, and food preparation procedures.
- 9.7.5 – Relate the composition of lipids and proteins to their function in foods and their impact on food preparation and nutrition.
- 9.7.6 – Explain the value of molds and enzymes in food products.
- 9.7.7 – Analyze the impact of food presentation methods and techniques on nutrient value, safety and sanitation, and consumer appeal of food and products.

14.0- Nutrition and Wellness

Content Standard 14.3 — Demonstrate ability to acquire, handle, and use foods to meet nutrition and wellness needs of individuals and families across the life span.

Competencies:

- 14.3.1 – Apply current dietary guidelines in planning to meet nutrition and wellness needs.
- 14.3.2 – Design strategies that address the health and nutritional recommendations for individuals and families, including those with special needs.
- 14.3.3 – Demonstrate ability to select, store, prepare, and serve nutritious, aesthetically pleasing food and food product.
- 14.3.4 – Evaluate policies and practices that impact food security, sustainability, food integrity, and nutrition and wellness of individuals and families.

Content Standard 14.4 — Evaluate factors that affect food safety from production through consumption.

Competencies:

- 14.4.1 – Analyze conditions and practices that promote safe food handling.
- 14.4.2 – Analyze safety and sanitation practices.
- 14.4.3 – Analyze how changes in national and international food production and distribution systems influence the food supply, including sustainability, organic food production and the impact of genetically modified foods.
- 14.4.4 – Investigate federal, state, and local inspection and labeling systems that protect the health of individuals and the public.
- 14.4.5 – Analyze foodborne illness factors, including causes, potentially hazardous foods, and methods of prevention.
- 14.4.6 – Analyze current consumer information about food safety and sanitation.

Content Standard 14.5 — Evaluate the influence of science and technology on food, nutrition, and wellness.

Competencies

- 14.5.1 – Investigate how scientific and technical advances influence the nutrient content, availability, and safety of foods.
- 14.5.2 – Analyze how the scientific and technical advances in food processing, storage, product development, and distribution influence nutrition and wellness.
- 14.5.3 – Analyze effects of technological advances on selection, preparation and home storage of food.
- 14.5.4 – Analyze the effects of food science and technology on meeting nutritional needs

Below, FCS Standards are connected with each lab’s objectives, critical thinking questions, teaching content and methods.

Following the FCS Standards are each lab’s STEAM and P21 connections.

Lab 1: Why Bake

1.0 – Career, Community and Family Connections

Content Standard 1.1

Competencies: 1.1.4, 1.1.5, 1.1.6

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

8.0 – Food Production and Services

Content Standard 8.1

Competencies: 8.1.1, 8.1.2, 8.1.3,

Content Standard 8.2

Competencies: 8.2.3, 8.2.5, 8.2.8, 8.2.11

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6

Content Standard 9.4

Competencies: 9.4.1

14.0—Nutrition and Wellness

Content Standard 14.3

Competencies 14.3.1; 14.3.2, 14.3.3, 14.3.4

Content Standard 14.4

Competencies 14.4.1, 14.4.2, 14.4.3, 14.4.4, 14.4.5

Content Standard 14.5

Competencies 14.5.1, 14.5.2, 14.5.3, 14.5.4

Lab 2: Getting Started

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

3.0 – Consumer Services

Content Standard 3.5

Competencies: 3.5.1, 3.5.2, 3.5.3, 3.5.4, 3.5.5, 3.5.6

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.5, 8.5.6, 8.5.7, 8.5.10, 8.5.11, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.4

Competencies: 9.4.1, 9.4.5

Content Standard 9.5

Competencies: 9.5.1, 9.5.2, 9.5.3, 9.5.6, 9.5.7

14.0—Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1, 14.3.2, 14.3.3, 14.3.4

Content Standard 14.4

Competencies 14.4.4

Lab 3: Wheat Flour and Cornmeal... The Staff of Life

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

3.0 – Consumer Services

Content Standard 3.5

Competencies: 3.5.1, 3.5.2, 3.5.3, 3.5.4, 3.5.5, 3.5.6, 3.5.7, 3.5.8

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.9, 8.5.10, 8.5.12, 8.5.14

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.4

Competencies: 9.4.1

Content Standard 9.5

Competencies: 9.5.1, 9.5.2, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1, 14.3.2, 14.3.3, 14.3.4

Content Standard: 14.4

Competencies: 14.4.1, 14.4.2, 14.4.3, 14.4.4

Content Standard: 14.5

Competencies: 14.4.5

Content Standard 14.5

Competencies: 14.5.1, 14.5.2, 14.5.4

Lab 4: Creating Lift: Chemical Leavening

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

4.0 – Education and Early Childhood

Content Standard 4.3

Competencies: 4.3.1; 4.3.2, 4.3.3, 4.3.4, 4.3.5; 4.3.6

Content Standard 4.4

Competencies: 4.4.1; 4.4.2; 4.4.3, 4.4.4

Content Standard 4.5

Competencies: 4.5.1; 4.5.2; 4.5.3; 4.5.4

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.7

Competencies: 9.7.1, 9.7.3, 9.7.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1, 14.3.2, 14.3.3, 14.3.4

Content Standard 14.4

Competencies: 14.4.4

Lab 5: Flavor Factor: Fats

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

Content Standard 2.2

Competencies: 2.2.1, 2.2.2, 2.2.3

4.0 – Education and Early Childhood

Content Standard 4.5

Competencies: 4.5.1; 4.5.2; 4.5.3; 4.5.4

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.7, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2, 8.6.8

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.7

Competencies: 9.7.5

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1, 14.3.2, 14.3.3, 14.3.4

Content Standard 14.4

Competencies: 14.4.4,

Content Standard 14.5

Competencies: 14.5.1; 14.5.2

Lab 6: The Amazing Power Plant – Yeast

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

Content Standard 1.3

Competencies: 1.3.1, 1.3.2, 1.3.6

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

4.0 – Education and Early Childhood

Content Standard 4.5

Competencies: 4.5.1; 4.5.2; 4.5.3; 4.5.4

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standards 8.6

Competencies: 8.6.1, 8.6.2

9.0 – Food Sciences, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.5

Competencies: 9.5.2, 9.5.3, 9.5.6

Content Standard 9.7

Competencies: 9.7.2, 9.7.7

14.0—Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1, 14.3.2, 14.3.3, 14.3.4

Content Standard 14.4

Competencies 14.4.4,

Content Standard 14.5

Competencies 14.5.1; 14.5.2

Lab 7: Sweet! Baking Sugars

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

4.0 – Education and Early Childhood

Content Standard 4.3

Competencies 4.3.4; 4.3.5; 4.3.6

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.5

Competencies: 9.5.2, 9.5.3, 9.5.6

Content Standard 9.7

Competencies: 9.7.1, 9.7.2, 9.7.4, 9.7.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1; 14.3.2

Lab 8: Eggs

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

4.0 – Education and Early Childhood

Content Standard 4.3

Competencies 4.3.4; 4.3.5; 4.3.6

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2, 8.6.8

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.5

Competencies: 9.5.2, 9.5.3, 9.5.6

Content Standard 9.7

Competencies: 9.7.1, 9.7.5, 9.7.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1; 14.3.2; 14.3.3;

Content Standard: 14.4

Competencies: 14.4.1; 14.4.2; 14.4.4; 14.4.5

Lab 9: Liquids

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.7, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2, 8.6.8

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.5

Competencies: 9.5.2, 9.5.3, 9.5.6

Content Standard 9.7

Competencies: 9.7.1, 9.7.2, 9.7.3, 9.7.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1; 14.3.2; 14.3.3;

Content Standard: 14.4

Competencies: 14.4.1, 14.4.2, 14.4.5

Lab 10: The Savor of Salt

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.5

Competencies: 9.5.2, 9.5.3, 9.5.6

Content Standard 9.7

Competencies: 9.7.1, 9.7.3, 9.7.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.1; 14.3.2; 14.3.3;

Content Standard: 14.4

Competencies: 14.4.1; 14.4.2; 14.4.5

Lab 11: Chocolate

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2

9.0 – Food Science, Dietetics, and Nutrition

Content Standard 9.2

Competencies: 9.2.1, 9.2.2, 9.2.5, 9.2.6, 9.2.7, 9.2.9

Content Standard 9.3

Competencies: 9.3.1, 9.3.2, 9.3.3, 9.3.5, 9.3.6, 9.3.7

Content Standard 9.5

Competencies: 9.5.2, 9.5.3, 9.5.6

Content Standard 9.7

Competencies: 9.7.1, 9.7.2, 9.7.5, 9.7.7

14.0 – Nutrition and Wellness

Content Standard 14.3

Competencies: 14.3.2, 14.3.3; 14.3.4

Content Standard: 14.4

Competencies: 14.4.1, 14.4.2

Lab 12: Dough Sculpting 101

1.0 – Career, Community and Family Connections

Content Standard 1.2

Competencies: 1.2.1, 1.2.3, 1.2.4, 1.2.6, 1.2.8

2.0 – Consumer and Family Resources

Content Standard 2.1

Competencies: 2.1.1, 2.1.2, 2.1.3

4.0 – Education and Early Childhood

Content Standard 4.3

Competencies: 4.3.1; 4.3.2; 4.3.3; 4.3.4; 4.3.5; 4.3.6

Content Standard 4.4

Competencies: 4.4.1; 4.4.2; 4.4.3; 4.4.4

Content Standard 4.5

Competencies: 4.5.2; 4.5.3; 4.5.4

8.0 – Food Production and Services

Content Standard 8.2

Competencies: 8.2.1, 8.2.3, 8.2.5, 8.2.6, 8.2.7, 8.2.8

Content Standard 8.3

Competencies: 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6

Content Standard 8.4

Competencies: 8.4.2, 8.4.3, 8.4.6, 8.4.7

Content Standard 8.5

Competencies: 8.5.1, 8.5.2, 8.5.3, 8.5.4, 8.5.10, 8.5.12, 8.5.14

Content Standard 8.6

Competencies: 8.6.1, 8.6.2

Lab 13: A Pantry of Resources

Locate the resources, references and links referred to in the labs and supporting their respective standards, STEAM and P21 objectives.

Connections to STEAM Education

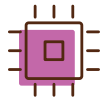
Baking is every bit as exciting as building computers and robots!

Review Baking Builds STEAM PowerPoint overview, HomeBaking.org/PDFBakingBuildsSTEAMWorkshop.pdf



Science

All twelve of the units in this resource have a baking science ingredient or consumer sciences lab component plus three, experience-specific baking labs included as an integral piece of experiential learning. Most of these labs utilize the scientific process as a basis for learning and gaining experience with baked goods. Additionally, many of the units focus on the scientific role of agricultural production for ingredients and the function of different ingredients in the baking process. These labs focus, in depth, on the essential ingredients in baked goods and strive for full scientific understanding of essential leavening, temperature, changes of state, mixture interactions and product storage. Career connections in agricultural, milling, baking and consumer sciences are included.



Technology

In addition to the use of kitchen equipment, these labs also make provisions for students to use various computer programs to research, analyze, alter, and test different recipes for nutrition value and cost. The use of these modern computer programs is important in preparing them for an ever-changing restaurant. Agricultural and baking technologies are further explored in the labs relative to new crop production, baking ingredients and product developments.



Engineering

Baking is, in essence, the engineering of ingredients to create a product that meets the need of a specific group of consumers. This teaching resource includes a highly diverse number of activities for students to participate in that give them a wide variety of experiences in making baked goods. Career connections with milling and baking engineering are provided.



Art

Opportunities to develop artisan baking skills baking are incorporated throughout the labs, offering three skill-level options and Community Connections to engage student bakers and their markets. Additional culinary arts are essential to many labs, as well as label content and design, product development and design, packaging and market placement.



Math

All labs require the essential culinary math skill mis en place—correctly ordering and preparing the ingredients, equipment and methods to produce consistently quality baked goods.

Many of the labs in this resource require students to calculate product costs, net weight, establish equivalencies with different types of ingredients, use fractions and decimals in the preparation of goods. Applied math skills and equipment are used to scale ingredients and dough for recipes and culinary formulas both up and down to fill the requirement of the activity.

Measurement of temperatures and volume differences are required for experiments as well as product production. Metric measurements are included for scaling ingredients and product.

These complex math practices are important in readying students for the highly diverse STEAM fields that exist in the world of food today.

Baking STEAM baking educator professional development workshop, New Tech H.S., Spokane, Wash.



Connections to the P21 Framework for 21st Century Learning**

Who: P21 is a national nonprofit organization that advocates for 21st century readiness for every student. P21 recognizes that all learners need educational experiences in school and beyond for success in a globally and digitally interconnected world. Representing over 5 million members of the global workforce, P21 unites business, government and education leaders from the U.S. and abroad to advance evidence-based education policy and practice and to make innovative teaching and learning a reality for all. *Note: The connections identified for A Baker's Dozen Labs do not imply an endorsement by P21.*

What: P21's mission is to serve as a catalyst for 21st century learning by building collaborative partnerships among education, business, community, and government leaders so that all learners acquire the knowledge and skills they need to thrive in a world where change is constant and learning never stops. Learn more at P21.org

Lab 1: Why Bake

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, History, Arts
- 21st Century Themes: Financial Literacy, Health Literacy

Learning and Innovation Skills

- Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy

Life and Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction
- Social & Cross-Cultural Skills
- Leadership & Responsibility

Lab 2: Getting Started

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Economics, Science
- 21st Century Themes: Civic Literacy, Global Awareness, Health Literacy

Learning and Innovation Skills

- Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Technology Skills

Life and Career Skills

- Initiative & Self-Direction
- Productivity & Accountability
- Leadership & Responsibility

Lab 3: Wheat Flour and Cornmeal... The Staff of Life

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, Economics
- 21st Century Themes: Health Literacy, Financial/Business Literacy, Health Literacy

Learning and Innovation Skills

- Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Technology Skills

Life and Career Skills

- Initiative & Self-Direction
- Productivity & Accountability
- Leadership & Responsibility

Lab 4: Creating Lift: Chemical Leavening

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, Economics
- 21st Century Themes: Business/Financial Literacy, Health Literacy

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information and Media Literacy, Technology Skills

Life and Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction

Lab 5: Flavor Factor: Fats

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, History, Economics
- 21st Century Themes: Global Awareness, Financial Literacy, Civic Literacy, Health Literacy

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Media Literacy, Technology Skills

Life and Career Skills

- Initiative & Self-Direction
- Productivity & Accountability
- Leadership & Responsibility

Lab 6: The Amazing Power Plant: Yeast

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, Economics
- 21st Century Themes: Financial Literacy, Health Literacy

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Technology Skills

Life and Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction
- Social & Cross-Cultural Skills
- Leadership & Responsibility

Lab 7: Sweet! Baking Sugars

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, Economics
- 21st Century Themes: Health Literacy, Financial Literacy

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Media Literacy, Technology Skills

Life and Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction
- Social & Cross-Cultural Skills
- Productivity & Accountability
- Leadership & Responsibility

Lab 8: Eggs

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, History
- 21st Century Themes: Civic Literacy, Health Literacy, Financial Literacy

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Media Literacy, Technology Skills

Life and Career Skills

- Initiative & Self-Direction
- Social & Cross-Cultural Skills
- Productivity & Accountability
- Leadership & Responsibility

Lab 9: Liquids

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science, Economics
- 21st Century Themes: Financial Literacy, Health Literacy

Learning and Innovation Skills

- Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Media Literacy, Technology Skills

Life and Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction
- Social & Cross-Cultural Skills
- Productivity & Accountability

Lab 10: The Savor of Salt

Content Knowledge and 21st Century Themes

- Content Knowledge: Math, Science
- 21st Century Themes: Health Literacy, Global Awareness

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Technology Skills

Life and Career Skills

- Flexibility & Adaptability
- Initiative & Self-Direction
- Leadership & Responsibility

Lab 11: Chocolate

Content Knowledge and 21st Century Themes

- Content Knowledge: History, Math, Science
- 21st Century Themes: Health Literacy, Global Awareness, Environmental Literacy

Learning and Innovation Skills

- Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Technology Skills

Life and Career Skills

- Initiative & Self-Direction
- Productivity & Accountability

Lab 12: Dough Sculpting 101

Content Knowledge and 21st Century Themes

- Content Knowledge: Arts, Math, Economics
- 21st Century Themes: Health Literacy, Financial Literacy, Civic Literacy

Learning and Innovation Skills

- Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration

Information, Media and Technology Skills

- Information Literacy, Media Literacy, Technology Skills

Life and Career Skills

- Flexibility & Adaptability
- Social & Cross-Cultural Skills
- Productivity & Accountability
- Leadership & Responsibility

Lab 13: Baking Resources

Content Knowledge and 21st Century Themes

- Find essential links to agricultural, milling and baking industry members, content knowledge, resources, careers, and test kitchens practices.

Information, Media and Technology Skills

- Connections to research baking ingredient topics, take initiative to gain baking ingredient knowledge, techniques and career connections.