THE
UNIVERSITY
OF RHODE ISLAND

Food Safety Education for
High School and Transition
Special Needs Students

Food Safety Smart Curriculum

March 2010

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Contents

Appendixes

Introduction

In the United States alone, the Centers for Disease Control estimate that each year, more than 76 million individuals suffer from a foodborne illness. These illnesses result in 325,000 hospitalizations and 5,000 deaths. Some cases are mild while others result in death. The estimated cost of these illnesses including lost wages, medical bills and lawsuits is as high as $8.5 billion a year.

For young adults with disabilities, transition planning should include the development of independent living skills. Skills in food preparation are important, but so too are skills in food safety. Food safety skills are often overlooked in food preparation curricula. The information and resources included in this curriculum complement any food preparation classroom and individual learning activities.

Since many adults with intellectual disabilities will enter careers in the food service industry, having knowledge and experience using good food safety practices can only enhance their employability. Thus, food safety education for special needs students, in particular those in grades 9–12 as well as those attending transition academies, can be considered an integral part of any life skills curriculum.

Food safety knowledge of high school and transition teachers of special needs students was assessed prior to development of this curriculum. There were 220 survey respondents from three New England states. Eighty percent (80%) of the survey respondents indicated that they were teaching food safety skills as part of life skills curriculum to their special needs students. Eighty-six percent (86%, N=190) of the teachers indicated that they were not only preparing and serving food in the classroom as part of the learning experience, but 94% of these respondents were also preparing foods that were considered potentially hazardous. Additionally, 61% of these teachers indicated that they did not have any food safety training. The overall objective of this teaching guide is to provide teachers with food safety resources that can be used with young adults who have learning and/or moderate disabilities and special needs requirements.

The food safety skills presented in this curriculum are designed to assist teachers in matching their instruction to the learning needs and characteristics of students with disabilities. The curriculum is based on the belief that good instruction can evolve in ways that improves access to the knowledge and skills needed to handle food safely for all students, including those whose learning needs may be outside traditional instructional methods and assessment. We promote that food safety skills are taught using the instructional principles of Universal Design for Learning (UDL) and evidence-based practices. More information on Universal Design may be found in Section I of the curriculum.

The curriculum content is based on the USDA Fight BAC!® Campaign, which is a food safety initiative designed to educate consumers about the four food safety principles—**clean, separate, cook, and chill.** The campaign's goal is to provide consumers with information and resources to help them reduce the risk of foodborne illness.

The Fight BAC! Campaign was developed by and continues to be promoted by the Partnership for Food Safety Education (PFSE). The PFSE is a not-for-profit organization that unites industry associations, professional societies in food science, nutrition and health, consumer groups, and the U.S. government to educate the public about safe food handling. It is funded by the contributions of industry trade and professional associations, grants, and through technical assistance and in-kind support provided by government agencies and consumer organizations. Information about Fight BAC! materials and resources that may complement this curriculum may be found on their website (www.fightbac.org).

The materials and resources presented in this curriculum reflect food safety principles for consumers and their food safety practices in the home. All of the information and many of the student activities can apply to a foodservice setting with minor adaptations. Information on adapting the materials for a foodservice setting is included in the Appendix.

Also, all the materials presented in this curriculum were designed to incorporate relevant professional standards from the Council for Exceptional Children. In particular, knowledge and skills from Standard 4 (Instructional Strategies), Standard 5 (Learning Environments and Social Interactions), Standard 7 (Instructional Planning), and Standard 10 (Collaboration), are incorporated.

Acknowledgements

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Universal Design for Learning

The Food Safety Smart curriculum supports the principles of Universal Design for Learning (UDL). They are anchored in a framework of teaching techniques, in which teaching materials and assessment are usable and accessible by as many people as possible regardless of age, ability or situation. In other words, instruction flows in ways that treat all students as capable learners by designing instruction that supports the widest range of learning styles and needs, while maintaining a high quality of instruction. In order to achieve this, barriers to instruction that would typically separate special learners are removed "up front" when designing the instruction. This alleviates the need to "retrofit" the instruction after the fact to meet the needs of a learner through accommodations or modifications. Many examples of universal design that were once considered unique and expensive have become commonplace in society (e.g., closed caption TV, building ramps, curb cuts, etc.).

In schools, standardized and achievement tests are untimed for all students. This removes the need for an extended time accommodation for the special needs learner. Universal design inherently removes the stigmatizing effect of accommodations and modifications. It shifts the emphasis of instruction from prescriptive requirements to performance based.

The Center for Applied Special Technology (CAST) (http://www.cast.org/index.html) is a national resource for UDL information and research. One of the many resources of the center is the Universal Design for Learning (UDL) Lesson Builder, which provides educators with models and tools to create and adapt lessons that increase access and participation in the general education curriculum for all students. Regardless of the content, a UDL lesson would ensure that there are:

1. Multiple means of representation, to give learners various ways of acquiring information and knowledge;
2. Multiple means of expression, to provide learners alternatives for demonstrating what they know; and
3. Multiple means of engagement, to tap into learners' interests, offer appropriate challenges, and increase motivation.

Universal design for learning relies on approaches that utilize differentiated levels and techniques of instruction so all learners, regardless of ability, have access to the curriculum equally. Differentiated instruction assumes that students approach learning from varying backgrounds of knowledge, readiness, language, and preferences in learning and interests. Differentiated instruction focuses on teaching and learning approaches for students of differing abilities in the same class. CAST also offers useful guidelines and strategies for designing differentiated instruction that are applicable in developing safe food handling lessons. The guidelines are available at: http://www.cast.org/publications/ncac/ncac_diffinstruc.html.

Evidence Based Instruction and Students with Disabilities

Research studies with students with disabilities that focused on the relationship between learner characteristics, how information was presented to the student, how students were engaged in their own learning, and how they were expected to demonstrate what they had learned allow us to recommend the following instructional approaches. Several curriculum and instructional design techniques can be easily aligned with the UDL principles. They include: 1. Direct instruction techniques; 2. Peer mediated learning; and 3. Cooperative learning.

Direct Instruction Techniques

Sometimes referred to as explicit instruction, direct instruction (and its variations) establishes a clear and visible systematic skill sequence delivered in ways that maximize the interactions between teachers and students. Direct instruction, with its roots in applied behavior analysis, looks to produce clear outcomes based on student performance and use these outcomes to monitor student progress and make decisions about the effectiveness of the instruction. Research has clearly demonstrated that direct instruction is successful with the full range of teacher and student populations (Adams & Engelmann, 1996).

Kameenui and Simmons (1990) provide a framework through which direct instruction techniques can be utilized to provide food safety skills to students with disabilities along with their peers. They organize instruction into design components and delivery components.

When designing a food safety education curriculum, teachers should use the following Design Components:

- Big Ideas—provide keys that unlock content for the range of diverse learners.
- Conspicuous Strategies—teach students specific problem solving strategies to accomplish complex tasks. Take great care to ensure that the strategies are well-designed and transfer to appropriate applications.
- Mediated Scaffolding—provides support to students in the form of steps, tasks, materials, and personal support during initial learning. Reduce tasks into manageable chunks to increase success. Scaffolding allows students to become successful and independent learners.
- Strategic Integration—combines essential information in ways that result in new and more complex knowledge. Strategic instruction offers learners an opportunity to successfully integrate several big ideas and learn content across multiple contexts. Strategic integration improves skill maintenance and generalization.
- Judicious Review—promotes the transfer of learning by requiring the application of content at different times and in different contexts. Review will vary from learner to learner. Student progress must be monitored in order to assess the effect of instruction.

When delivering instruction, teachers should use the following Delivery Components:

- Require frequent student responses—Students achieve greater success when they actively participate in their learning. Elicit student responses several times per minute, for example, by asking students to say, write, or do something. Highly interactive instructional procedures keep students actively engaged and provide them with adequate practice.
- Appropriate Instructional Pacing—The rate of instructional presentations and response are influenced by many variables such as task complexity or difficulty, relative newness of the task, and individual student differences. Students benefit when the instruction is well paced, when they are fully informed about expectations and are fully engaged during the process.
- Provide Adequate Processing Time—Allow adequate time to elapse between the moment a task is presented and when the student is asked to respond. Time to pause and think should vary based on the difficulty of the task relative to the student.
- Monitor Responses—Constantly monitor how students are responding to ensure that all students are mastering the skills presented. Make appropriate adjustments during the presentation.
- Provide feedback for correct and incorrect responses—Provide immediate for feedback both correct and incorrect responses. Corrective feedback needs to be instructional and not accommodating. Be specific to the task.

Peer Mediated Learning

Peer-Mediated Instruction is a classroom alternative for students with disabilities and useful for building academic and social skills. Typically, it relies on students to work in pairs (dyads) or small cooperative learning groups. Students must be taught roles in the instructional activity and to be systematic. They are also taught how to elicit responses and how to provide feedback. Peer teaching is most effective for practice and reinforcement of familiar material but not for new learning.

Cooperative Learning

Cooperative learning is based on a systematic organization of three to six students who are encouraged to work and learn together. Group and individual learning activities are assigned to each group member based on the individual learner needs, abilities and characteristics. Students depend on each other to learn academic material while developing stronger social skills. The goal is for the group to produce a common product that reflects positively on the group and each individual. Groups may remain intact during the entire lesson or separate for individual work only to come together again to complete a final report, project or presentation.

In conclusion, evidence-based techniques and Universal Design Learning are well suited for use in a food safety education curriculum targeting special needs students.

UDL Resources

These Web-based resources will provide additional background and applied information about UDL and evidence based practice.

Differentiated Instruction

Tomlinson, C.A., (2000). Differentiation of instruction in the elementary grades. *ERIC Digest.* ERIC_NO: ED443572.
http://ericir.syr.edu/plweb-cgi/obtain.pl

Web Article: "Mapping a route toward differentiated instruction."
http://pdonline.ascd.org/pd_online/diffinstr/e1199909_tomlinson.html

For information on mapping the route to differentiated instruction, see the website of The Association for Supervision and Curriculum Development (ASCD), http://www.ascd.org.

Direct Instruction

National Center to Improve the Tools of Educators
http://idea.uoregon.edu/~ncite/

Peer Mediated Learning and Cooperative Learning Jigsaw Classroom
http://www.jigsaw.org/

Office of Research, Education Consumer Guides: Cooperative Learning
http://www.ed.gov/pubs/OR/ConsumerGuides/cooplear.html

The Cooperative Learning Network
http://home.att.net/~clnetwork

J.F.K. Center for Research on Human Development, Vanderbilt University
http://www.vanderbilt.edu/kennedy/topics/peers.html

For information on peer tutoring and cross-age tutoring, see the website of Education Northwest, http://www.nwrel.org.

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How to Use the Curriculum

Curriculum Design

The food safety concepts presented in this curriculum address the four *Fight BAC!* principles: Clean, Separate, Cook, and Chill. *Fight BAC!* is a food safety initiative designed to educate consumers about these four food safety principles. The goal of this initiative is to provide consumers with information and resources to help them reduce the risk of foodborne illness.

The curriculum units are supported by a 15-minute video, which features four students preparing a simple meal during which the *Fight BAC!* principles are addressed. The video is divided into seven chapters: Planning, Proper Storage, Preparation, Cooking, Serving, Refrigerate, and Clean-up. Each chapter of the video is divided into two sections. The first showing incorrect food safety behaviors and the second demonstrating correct food safety behaviors. Following the incorrect behaviors there is an opportunity to pause the video for classroom discussion. The chapter name and number applicable to each lesson are listed in each lesson.

The curriculum is divided into seven units.
1. Introduction to Food Safety
2. The Microworld
3. Fight BAC! Principle: Clean
4. Fight BAC! Principle: Separate
5. Fight BAC! Principle: Cook
6. Fight BAC! Principle: Chill
7. Putting It All Together

Each Lesson Includes

- **Introduction** to the food safety principles presented in the lesson
- **Lesson Outcomes** explaining student outcomes
- **Essential Vocabulary** includes food safety terms that are being introduced in the lesson. All Essential Vocabulary words are found in the *Food Safety Dictionary,* located in the Appendix. Any discussion of food safety will involve some basic microbiology, so terminology can be complicated. The food safety "microworld" includes four categories of microorganisms: bacteria, viruses, parasites, and fungi. Not all microorganisms cause foodborne illness; those that do are called pathogens. The most common causes of foodborne illness are viruses and bacteria. Throughout the curriculum, the authors have chosen to use the word "microbes" when talking about any of the microorganisms that cause foodborne illness and will also use the word "bacteria" when referring to the specific type of microorganism. Depending on students' comprehension level, you may choose to use "bacteria," "bacteria and viruses," "microbes," "microorganisms," or "pathogens" when referring to the microbes that make people sick.
- **Teaching Points** are provided in outline form so that you can use your own instructional style based on students' learning level. The Teaching Points begin with an "Opening Questions." These questions may be asked of students prior to the lesson with the intent of stimulating discussion as well as assessing their food safety knowledge. The questions are followed by notes to the teacher that support classroom discussion.
- **Learn More About It** lists additional resources on each unit topic. Some sites are interactive and could be used with students to reinforce learned material. Many of the sites provide in depth food safety information you may find useful in preparing to teach the unit.
- **Student Activities** are hands-on and serve to strengthen food safety concepts discussed in the lesson. They are located at the end of the unit. The directions for the activity are written for the teacher. Several of the activities can be used to support more than one lesson in a unit. Any of the activities can be done as either individual or group student projects or as classroom activities led by the teacher. It should be noted that some students may require assistance from a teacher or paraprofessional to read the instructions and complete the activity.

Some of the Student Activities must be done in a full kitchen. If your classroom does not have a fully equipped kitchen, we recommend you work with your school's family and consumer sciences or culinary arts teacher.

■ **Post-test Questions** may be combined and used as a final test to be administered at the conclusion of the curriculum. An answer key is also included in this section.

■ **Student Reflection** opportunities are included for each lesson/unit. Copies of a Student Reflection Worksheet are located at the end of each unit.

Additional Curriculum Resources

All of the curriculum resources may be found on CD #1.

■ S**tudent Activity Matrix** is located at the end of this section. The matrix lists all the curriculum student activities and those lessons with which they may be used.

■ T**he Foodservice Application of the Curriculum** is located in the Appendix. It includes basic information and resources for each unit to be included if the curriculum is being used to prepare students to work in a foodservice environment. All the information is based on the current Food and Drug Administration (FDA) Model Food Code. The materials and resources presented in the curriculum reflect food safety principles for consumers and their food safety practices at home. A power point presentation supporting the foodservice application of the curriculum is located on CD #1.

■ **Photo File** is located on CD #1. A photo file and an addendum including additional pictures is also on CD #1. This collection of photos illustrates specific food safety practices. The photos may be used to reinforce food safety practices, such as hand washing, which are addressed in the curriculum. Students could be asked to put the photos in order to illustrate a particular food safety practice/principle. They could be laminated and used as flash cards. Descriptions and identification photos relating the objectives of each unit/lesson are listed in the lesson. Also, a complete listing and description of all the photos may be found in the Appendix.

■ **Food Safety Practices Assessment** is located in the Appendix. This evaluation tool could be used to evaluate the effectiveness of food safety education principles presented in the curriculum. The tool requires observing students in "real-life" kitchen and food preparation settings where they can demonstrate what they have learned.

■ **Interactive Power Point Activity** is located on CD #2. This activity can be used several ways in the classroom. If there are computers available, students can work on this activity in small groups. Or, the teacher could read the questions and the class could work together to answer the questions. If classroom resources and abilities allow, students can also work on the questions individually. Consider using this activity to introduce a unit in the curriculum. Choose questions that relate to the unit you are working on. Present questions to the whole class. The class can think of answers together and have a discussion with the teacher so they slowly become familiar with the upcoming unit's contents. Once the unit is completed revisit the introductory question and see if student responses to questions have changed. In the Appendix, you will find the questions (identified with the corresponding unit) and the answer key for the activity. There is a printed copy of the power point slides in the Appendix.

■ **Teacher In-Service Training Power Point Presentation** is provided on CD #1. The presentation includes information about the curriculum development project, current food safety issues and the content of the curriculum package. This presentation is for use when training additional teachers.

Curriculum Application for Special Needs Students

The Individuals with Disabilities Education Improvement Act of 2004 (IDEA 2004) requires transition services for all students age 16 and older who receive special education services. (Note: some states are mandated to begin transitional services at an earlier age). The intent of transition services is to "facilitate the child's movement from school to post school activities, including postsecondary education, vocational education, integrated employment (including supported employment), continuing and adult education, adult services, independent living, or community participation" (§300.43(a)(1)). Students may also be provided with Vocational Education, i.e. "organized educational programs that are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career not requiring a baccalaureate or advanced degree" (§300.39(b)(4)). Moreover, the law requires "The development of employment and other post-school adult living objectives; and if appropriate, acquisition of daily living skills and provision of a functional vocational evaluation" (§300.43(a)(1)) (iv, (v)).

The Food Safety Smart curriculum is designed as a resource for professionals who work with young adults with disabilities and are preparing for the transition to adult life. Many students with intellectual disabilities move into jobs that relate to food services, including food handling, preparation and delivery. The curriculum can serve as a means to address the development and implementation of transition objectives related to employment, and in some situations, Vocational Education. Additionally, as previously noted, foodborne Illness is a serious national health issue. The Food Safety Smart curriculum has direct relevance to the teaching of daily living skills to all students who are preparing to transition to adult life.

Relation to Evidence-Based Practice

This curriculum, along with the associated learning objectives and instructional and assessment activities, recognizes that student outcomes and accountability should evolve from a "best practices" approach. Many of the activities in the curriculum are linked to the research evidence supporting useful secondary transition practices. The National Secondary Transition Technical Assistance Center (www.nsttac.org) has identified these components of the curriculum as having been supported with high to moderate levels of evidence.

- schooling: provide skills and knowledge that lead to work-based learning;
- career preparatory experiences: help students prepare for postsecondary education, career and independent living;
- youth development: help students set personal goals, improve self-esteem and serve as role models;
- connecting activities: provide supports to assist students to gain access and achieve suc cess in post-school options;
- teaching self-concept skills; and
- teaching job-specific skills.

We have made every attempt to embed the curriculum activities wherever possible with the best practices components. Please consider that the alignment may range on a continuum from direct to implied. They should be utilized accordingly. The purpose of aligning the Food Safety Smart curriculum skills sequence with relevant research best practices is to encourage teachers to use the curriculum in meeting local and state instructional mandates. The curriculum skills and learning activities are also appropriate to use when designing and implementing the academic and transition portions of a student's Individualized Education Program (IEP).

Food Safety Smart Curriculum and IEP Planning

Research supports the use of a concept map (Kohler, 1996) that can assist an education team in including the food safety concepts and skills found in this curriculum. The "concept map," also known as Kohler's Taxonomy for Transition Programming, is organized around five major components. A sample "concept map" is found in the Appendix. The five major components are:

1. Student-focused planning. Student-focused planning practices focus on using assessment information and facilitating students' self-determination to develop individual education programs based on students' post-school goals.

2. Student development. Student development practices emphasize life, employment, and occupational skill development through school-based and work-based learning experiences. Student assessment and accommodations provide a fundamental basis for student development that result in successful transition.

3. Interagency collaboration. Interagency collaboration practices facilitate involvement of community businesses, organizations, and agencies in all aspects of transition-focused education. Interagency agreements clearly articulate roles, responsibilities, communication strategies, and other collaborative actions that enhance curriculum and program development foster collaboration.

4. Family involvement. Family involvement practices are associated with parent and family involvement in planning and delivering education and transition services. Family-focused training and family empowerment activities increase the ability of family members to work effectively with educators and other service providers.

5. Program structure. Program structures and attributes are features that relate to efficient and effective delivery of transition-focused education and services, including philosophy, planning, policy, evaluation, and human resource development. The structures and attributes of a school provide the framework for a transition perspective.

We encourage teachers and other members of a students' IEP team to use the map when matching the curriculum skills and learning activities to relevant yearly outcome goals associated with accountability. The map is also useful when designing present and long range goals associated with the successful transition to work, postsecondary education and independent living.

Reference

Kohler, P.D. (1996). *A taxonomy for transition programming: Linking research and practice.* Champaign: Transition Research Institute, University of Illinois.

Resources

Related resources about transition and students with disabilities attending secondary and post secondary schools.

National Secondary Transition Technical Assistance Center (www.nsttac.org)

PACER Center (www.pacer.org)

National Information Center for Children and Youth with Disabilities (www.nichcy.org)
National Post-school Outcomes Center (www.psocenter.org)

National Longitudinal Transition Study-2 (www.nlts2.org)

Transition Coalition (www.transitioncoalition.org)

On-Campus Outreach (www.education.umd.edu/ocol)
National Center on Secondary Education and Transition (www.ncset.org)

National Dropout Prevention Center for Students with Disabilities (www.ndpc-sd.org)

Unit/Activity Matrix

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
A-1	x	x	x	x	x	x	x
A-2	x						
A-3	x	x	x	x	x	x	x
A-4		x					
A-5		x					
A-6			x				
A-7	x		x	x	x	x	x
A-8			x				
A-9			x				
A-10			x				x
A-11			x				x
A-12			x	x	x	x	x
A-13			x	x	x	x	x
A-14				x			
A-15				x			
A-16				x			
A-17				x			x
A-18				x		x	x
A-19					x		
A-20					x		x
A-21						x	
A-22						x	x
A-23						x	
A-24						x	x
A-25						x	x
A-26							x
A-27							x

Units

Unit 1 Student Overview to Food Safety
Unit 2 The Microworld
Unit 3 Fight BAC Principle, Clean
Unit 4 Fight BAC Principle, Separate
Unit 5 Fight BAC Principle, Cook
Unit 6 Fight BAC Principle, Chill
Unit 7 Putting It All Together

Activities

A-1 Food Safety Survey
A-2 Parent/Caregiver Information
A-3 Reflection Worksheet
A-4 Growing Bacteria/Microbes
A-5 Double Trouble
A-6 Handwashing Scorecard
A-7 How Do We Wash Our Hands?
A-8 Write Your Own Handwashing Song or RAP
A-9 Water and Oil, Do They Mix?
A-10 Keep It Clean, What's Wrong with This Picture?
A-11 Keep It Clean, Kitchen Surfaces
A-12 Keep It Clean, Cleaning Up Spills
A-13 Clean Up, Recipe for Success
A-14 Pass the Apple
A-15 Travelin' Bugs
A-16 How Do Bacteria Get Around?
A-17 Set a"Food Safe" Table
A-18 Where Does It Go?
A-19 What Temperature Am I?
A-20 Checking Food Temperatures, Time and Temperature
A-21 Yeast Balloon Blow-Up
A-22 Time and Temperature, Refrigeration Temperature Log
A-23 Time and Temperature, Cool Down
A-24 Packing a Safe Lunch
A-25 The Lunch Test
A-26 Putting It All Together, Appreciation Luncheon
A-27 Summary of Food Safety Survey

Curriculum Pretest

Student Name: _____

Directions

Below is a list of statements about food safety. Please circle Y (yes) if you agree with the statement and circle N (no) if you disagree with the statement. If you don't know (DK) the answer, please circle DK.

Unit 2	Yes	No	Don't Know
1. It could take only a small number of harmful bacteria to make a person sick.	Y	N	DK
2. All bacteria found in food can make you sick.	Y	N	DK
3. Microorganisms are so small you can't see them with just your eyes.	Y	N	DK
4. You can see, smell and/or taste when food is unsafe.	Y	N	DK
5. Bacteria need food and water to survive.	Y	N	DK
6. Most microorganisms multiply most rapidly when the food is in the refrigerator.	Y	N	DK
7. People may have harmful bacteria on their hands.	Y	N	DK

Unit 3	Yes	No	Don't Know
8. You should wash your hands at least 15 seconds with warm water and soap before preparing food.	Y	N	DK
9. It is important to wash hands after touching raw meat.	Y	N	DK
10. Countertops should be cleaned before preparing food on them.	Y	N	DK
11. After washing your hands it is ok to dry them on your apron.	Y	N	DK
12. It is important to wash a cutting board after using it to cut up raw meat.	Y	N	DK
13. It is safe to use a cloth towel to clean up spills on kitchen counters and then use it to dry off fresh vegetables.	Y	N	DK
14. Sponges and/or dishcloths used to wipe up juices from raw meat, fish or poultry can be used to wash dishes if they have been rinsed in hot water.	Y	N	DK

Unit 4	Yes	No	Don't Know
15. Cutting boards used to cut up raw meat, fish or poultry should be cleaned before using with any other foods.	Y	N	DK
16. It's okay to store raw meat, fish or poultry wherever there is room in the refrigerator.	Y	N	DK
17. It is safe to place cooked hamburgers on the same unwashed plate that was used to bring the uncooked meat out to the grill.	Y	N	DK
18. When grocery shopping you can just put tomatoes and bananas in the same bag with raw chicken and hamburger.	Y	N	DK
19. It is not safe to use the same spoon to taste and then stir the food without washing the spoon.	Y	N	DK
20. Dishwashing detergent can be stored with dry food ingredients (i.e., flour and sugar as long as it is kept in the container it came in).	Y	N	DK
21. It's okay to store fresh produce anyplace in the refrigerator where there is room.	Y	N	DK

Curriculum Pretest

Student Name: _____

Unit 5	Yes	No	Don't Know
22. Always rotate food cooked in a microwave to avoid "cold spots" in the food.	Y	N	DK
23. Leftovers should be reheated to at least 140° F.	Y	N	DK
24. When cooking eggs, it's okay if the yolk is runny.	Y	N	DK
25. It is safe to taste raw cookie dough that contains raw eggs.	Y	N	DK
26. It is safe to use raw eggs in recipes that will not be cooked.	Y	N	DK
27. You can tell that baked chicken is thoroughly cooked by the color of the juices.	Y	N	DK
28. Using a food thermometer is the best way of knowing that food is thoroughly cooked.	Y	N	DK
29. You should always bring soup to a boil when it is reheated.	Y	N	DK

Unit 6	Yes	No	Don't Know
30. Leftovers after a meal can be safely left on the counter for 4 hours.	Y	N	DK
32. The safest place to defrost frozen chicken is on the kitchen counter.	Y	N	DK
33. The temperature of a refrigerator should be 40° F or lower.	Y	N	DK
34. It is safe to leave hot cooked food on the counter to completely cool at room temperature before putting in the refrigerator.	Y	N	DK
35. It's okay to defrost food in the microwave and cook it immediately.	Y	N	DK
36. If a green bean casserole is left on the kitchen counter overnight, it's safe to eat if it is properly reheated.	Y	N	DK
37. A very large pot of chicken soup will cool very quickly in the refrigerator and be safe to eat.	Y	N	DK

Curriculum Pretest Scoring Guide

Directions

Below is a list of statements about food safety. Please circle Y (yes) if you agree with the statement and circle N (no) if you disagree with the statement. If you don't know (DK) the answer, please circle DK.

Unit 2	**Yes**	**No**
1. It could take only a small number of harmful bacteria to make a person sick.	(Y)	N
2. All bacteria found in food can make you sick.	Y	(N)
3. Microorganisms are so small you can't see them with just your eyes.	(Y)	N
4. You can see, smell and/or taste when food is unsafe.	Y	(N)
5. Bacteria need food and water to survive.	(Y)	N
6. Most microorganisms multiply most rapidly when the food is in the refrigerator.	Y	(N)
7. People may have harmful bacteria on their hands.	(Y)	N

Unit 3	**Yes**	**No**
8. You should wash your hands at least 15 seconds with warm water and soap before preparing food.	Y	(N)
9. It is important to wash hands after touching raw meat.	(Y)	N
10. Countertops should be cleaned before preparing food on them.	(Y)	N
11. After washing your hands it is ok to dry them on your apron.	Y	(N)
12. It is important to wash a cutting board after using it to cut up raw meat.	(Y)	N
13. It is safe to use a cloth towel to clean up spills on kitchen counters and then use it to dry off fresh vegetables.	Y	(N)
14. Sponges and/or dishcloths used to wipe up juices from raw meat, fish or poultry can be used to wash dishes if they have been rinsed in hot water.	Y	(N)

Unit 4	**Yes**	**No**
15. Cutting boards used to cut up raw meat fish or poultry should be cleaned before using with any other foods.	(Y)	N
16. It's okay to store raw meat, fish or poultry wherever there is room in the refrigerator.	Y	(N)
17. It is safe to place cooked hamburgers on the same unwashed plate that was used to bring the uncooked meat out to the grill.	Y	(N)
18. When grocery shopping you can just put tomatoes and bananas in the same bag with raw chicken and hamburger.	Y	(N)
19. It is not safe to use the same spoon to taste and then stir the food without washing the spoon.	(Y)	N
20. Dishwashing detergent can be stored with dry food ingredients (i.e., flour and sugar as long as it is kept in the container it came in).	Y	(N)
21. It's okay to store fresh produce anyplace in the refrigerator where there is room.	Y	(N)

Curriculum Pretest Scoring Guide

Unit 5	Yes	No
22. Always rotate food cooked in a microwave to avoid "cold spots" in the food.	(Y)	N
23. Leftovers should be reheated to at least 140°.	Y	(N)
24. When cooking eggs, it's okay if the yolk is runny.	Y	(N)
25. It is safe to taste raw cookie dough that contains raw eggs.	Y	(N)
26. It is safe to use raw eggs in recipes that will not be cooked.	Y	(N)
27. You can tell that baked chicken is thoroughly cooked by the color of the juices.	Y	(N)
28. Using a food thermometer is the best way of knowing that food is thoroughly cooked.	(Y)	N
29. You should always bring soup to a boil when it is reheated.	(Y)	N

Unit 6	Yes	No
30. Leftovers after a meal can be safely left on the counter for 4 hours.	Y	(N)
31. The safest place to defrost frozen chicken is on the kitchen counter.	Y	(N)
32. The temperature of a refrigerator should be 40° F or lower.	(Y)	N
33. It is safe to leave hot cooked food on the counter to completely cool at room temperature before putting in the refrigerator.	Y	(N)
34. It's okay to defrost food in the microwave and cook it immediately.	(Y)	N
35. If a green bean casserole is left on the kitchen counter overnight, it's safe to eat if it is properly reheated.	Y	(N)
36. A very large pot of chicken soup will cool very quickly in the refrigerator and be safe to eat.	Y	(N)

Introducing Students to Food Safety

Introduction
Most of us learn our food safety practices at home and at school. As many of your students also currently work or will work in the foodservice industry, adherence to food safety principles is critical for job performance. In order to reduce the risk of foodborne illness, it is critical that students and their families understand the consequences of not addressing food safety hazards at home and at school. The food safety survey is a way to introduce the topic to family members and classmates and to share food safety principles.

Lesson Outcome
Students will gather information on the food safety practices of their family members and classmates.

Essential Vocabulary
Foodborne illness. Sickness caused by eating contaminated food. Some people call it "food poisoning." See *contamination.*

Teaching Points

Opening Question

What do your parents/caregivers and friends know about food safety?
This is an opportunity for your students to work with their parents, caregivers and friends to determine the extent of food safety knowledge they have. As the curriculum progresses students may be able to assist in educating others.

Notes
- This first lesson can serve as an introduction to the curriculum.
- The directions for conducting the survey are included in the student activities section.
- Discuss the meaning of "food safety." Use the term listed in the Essential Vocabulary to begin the discussion.
- Food safety includes food handling practices that help us protect food from a variety of safety hazards. Examples of food safety hazards including microbes or bacteria, chemicals such as bug spray or cleaners in your kitchen, and things like glass or metal that might get into our food.
- Everyone who grows, processes, transports, prepares, and stores food needs to handle food safely.
- Food Safety doesn't just happen; people play a major role in keeping food safe.
- Each year, there are 76 million reported cases of foodborne illness.
- 325,000 hospitalizations due to foodborne illness and 5,000 deaths.

Student Activities
A-1 Food Safety Survey
A-2 Parent/Caregiver Information
A-3 Reflection Worksheet

Note: The surveys should be set aside to be tabulated and the results reviewed after all the lessons have been taught. This will be accomplished as part of an end-of-curriculum activity (A-27), the last activity in Unit 7.

Learn More About it

www.fightbac.org
- Food safety campaign website

www.inspection.gc.ca
- Food/Food Safety Games/ Food Safety Wheel Game

Student Activity A-1
Food Safety Survey

Introduction

In this activity students will interact with other students, their families and/or other caregivers to identify issues related to the safe handling of food. They will also compile the data collected in order to record and present the results.

Supplies

- Copies of the survey
- Clipboards
- Pencils
- A-1Food Safety Survey Worksheet

Directions

1. Determine who the student will administer the survey to, i.e. fellow students, parents/ caregivers or the general public. Also, determine how many surveys each student(s) will be responsible for. Note: It may be necessary to obtain permission from the school administration to conduct the survey. Be sure to check ahead of time.
2. Distribute copies of the survey, clipboards and pencils and review with students. Read through the survey with the students.
3. Explain that information can be gathered from four individuals on each survey. They should record the person's name in the box at the top of column. The person being interviewed should give a yes or no answer.
4. Have students work in pairs to practice giving the survey to each other. Show how long 20 seconds lasts when discussing questions 1 and 2.
5. Provide students with a timeline to conduct the survey.
6. The surveys should be collected and held until the students complete the whole curriculum. The activity involving tabulating and reviewing the results of the survey is located in Unit 7.

Adapted from: The Partnership for Food Safety Education, www.fightbac.org

Student Activity A-1
Food Safety Survey

CLEAN

Did You…	Name	Name	Name	Name
Wash hands with warm water and soap for 20 seconds before preparing food?				
Wash hands with warm water and soap for 20 seconds before eating?				
Clean countertops before preparing food?				
Rinse fruits and vegetables with cool running water before preparing them?				
Rinse fruits and vegetables with cool running water before eating them?				
Totals	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**

SEPARATE

Did You…	Name	Name	Name	Name
Clean the cutting board used for raw meat, fish and poultry before using for any other foods?				
Keep raw meat, fish and poultry wrapped properly in the refrigerator so juices do not drip on other food?				
Put cooked meat, fish and poultry on a different platter than the one with the raw juices?				
Totals	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**

Student Activity A-1
Food Safety Survey

COOK

Did You…	Name	Name	Name	Name
Rotate food in the microwave to avoid "cold spots?"				
Bring sauces, soups and gravy to a boil when reheating?				
Make sure eggs were cooked properly?				
Not eat cookie dough or cake batter that was made with raw eggs?				
Totals	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**

CHILL

Did You…	Name	Name	Name	Name
Use a cold pack for packed lunches or picnic food?				
Refrigerate leftovers right away?				
Defrost foods in: _____ the refrigerator or _____ cold water or _____ the microwave?				
Totals	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**	**Yes =** **No =**

Student Activity A-2
Parent/Caregiver Information

Introduction

This activity provides an opportunity for students and teachers to inform parents/caregivers and others about what food safety education activities are taking place in their child's classroom and school.

Supplies

- Signed copies of letter on school letterhead
- Copies of the *Be Food Safe* brochure to be sent home with the letter. A copy of the pamphlet is included in Appendix 3. Note: The most current copy may be found at the Be Food Safe Web site: www.befoodsafe.org.

Directions

1. Have students review the sample letter and write one to their parents/caregivers that talks about the food safety education activities they will be participating in during the next two weeks. They might do a rough draft and after review by the teacher, copy it onto school letterhead. Ask students to take home copies of the parent/caregiver letter and the *Be Food Safe* brochure to share at home.

Sample Parent/Caregiver Letter

School letterhead

Date

Dear Parent/Caregiver(s)

During the next few weeks, your child will be learning all about food safety. The news media has been covering a lot of stories in the last year about foodborne illness outbreaks and the safety of our food supply. You may have heard about botulism in one brand of canned chili, *E.coli* in bagged spinach from California or concerns about food imported from China. Safe food handling, storage and good personal hygiene practices can help reduce the chances that you will suffer from food-related illnesses.

The series of food safety lessons that we will use was developed by Cooperative Extension staff and faculty from the universities of Rhode Island, Massachusetts, and Connecticut with input from special needs educators in these three states. These lessons will help your child learn the importance of safe food handling and storage, through cooking and good personal hygiene practices.

During the next few weeks, as we study food safety principles, encourage your child to share this information with you and you family. Enclosed is a copy of *Be Food Safe* brochure, which summarizes many of the concepts we will be talking about in the classroom.

Please be in touch if you have questions or comments about this program. I can be reached at (telephone #) or (e-mail address). Thank you.

Regards,

Teacher
School

Adapted from: *Food Safety House, Food Safety Education Curriculum for Grades 1–6*

Sample Parent/Caregiver Letter, Spanish

School letterhead

Date

Estimado padre/cuidador(s)

Durante las próximas semanas, su hijo estará aprendiendo todo acerca de la seguridad alimentaria. Los medios de comunicación ha estado cubriendo una gran cantidad de historias en el último año sobre los brotes de enfermedades transmitidas por los alimentos y la seguridad de nuestro suministro de alimentos. Usted puede haber oído acerca de botulismo en una marca de chiles enlatados, E. coli en espinaca en bolsa de California o preocupaciones acerca de los alimentos importados de China. La manipulación de alimentos, almacenamiento y buenas prácticas de higiene personal puede ayudar a reducir las probabilidades de que usted sufre de enfermedades relacionadas con la alimentación.

La serie de lecciones sobre seguridad alimentaria que se utilizará fue desarrollado por la Cooperativa El personal de extensión y profesores de las Universidades de Rhode Island, Massachusetts y Connecticut, con la participación de los educadores especiales necesidades en estos tres estados. Estas lecciones le ayudarán a su niño a aprender la importancia de la manipulación de alimentos y almacenamiento seguro, a través de la cocina y las buenas prácticas de higiene personal.

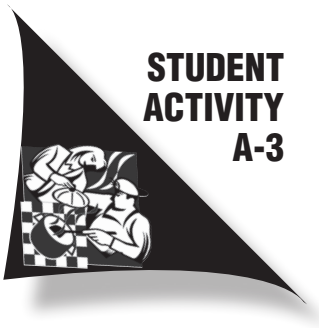
Durante las próximas semanas, como los alimentos principios estudio de seguridad, aliente a su niño a compartir esta información con usted y su familia. Se adjunta una copia de la Lucha contra el BAC! Cuatro simples pasos para Seguridad Alimentaria, que resume muchos de los conceptos que vamos a estar hablando en el aula.

Por favor, estar en contacto si tiene preguntas o comentarios sobre este programa. Yo puedo ser contactada en el (Nº de teléfono) o (e-mail). Gracias.

Recuerdos,

Profesor
Escuela

Student Activity A-3
Reflection Worksheet



1. What have you learned from this lesson?

2. What changes do you plan to make in your food safety practices based on the results of this lesson?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

The Microworld

Introduction

Sometimes when microbes get into food, the food can make us sick. When we get sick from the food we eat, we have a foodborne illness. Some people call it food poisoning. But most of time we are not poisoned, we are just sick! Usually when food makes us sick we feel sick to our stomach. We may have diarrhea, sometimes a fever, or we may feel tired. Our muscles ache or hurt and we may have a headache. There are other illnesses that can make us feel this way, so it can be hard to tell the difference.

In this lesson, you will learn about how we can get sick from microbes that sometimes get into food. We will learn how to keep microbes from growing in the food we eat.

Lesson Outcomes

Students will:
1. Learn that when we get sick from food that has microbes in it, it is called foodborne illness.
2. Learn about microbes that can get into the food we eat.
3. Learn about how microbes get into the food we eat.
4. Know how to keep the microbes out and keep the food safe.

Essential Vocabulary

Bacteria. Tiny living things that are not animals or plants. Unlike parasites and viruses, bacteria grow in food. You can only see them through a microscope, and you cannot smell or taste them. Some bacteria are helpful, other bacteria can cause sickness. The bacteria that cause sickness are often called pathogens or harmful microbes. See microbes/microorganisms.

Clean. To remove all dirt and bits of food that you can see from dishes, countertops, cutting boards and other food contact surfaces. Cleaning is NOT the same as sanitizing. See food contact surface; sanitize.

Foodborne illness. Sickness caused by eating contaminated food. Some people call it "food poisoning." See contamination.

Fungi. A group of microorganisms that includes molds and yeasts. See microorganism; molds; yeast.

Microbes/Microorganisms. These very tiny living things can only be seen through a microscope. They include bacteria, viruses and fungi. Some may be harmful to people and others are helpful. Harmful microbes that can make people sick are called pathogens or harmful bacteria. See bacteria; virus; parasite; fungi.

Parasite. A microorganism that lives in some animals, fish or plants. The parasite needs the person, animal, fish or plant in order to live. People can get sick if they eat a live parasite in food, which will then grow in them.

Pathogen. Microorganisms that cause sickness: includes harmful bacteria, viruses, and parasites. See microbes/microorganisms; bacteria; virus; parasite.

Personal hygiene. Keeping yourself clean by having good health habits, such as bathing, washing hair, wearing clean clothes and washing hands often.

Risky Foods. Also called potentially hazardous foods (PHF). Risky foods can support the growth of harmful microbes that can cause foodborne illness. These foods usually have high protein and moisture content and are low in acid. (Note in the current FDA Food Code PHF are referred to as TCS Foods- Time/temperature control for safety.)

Temperature Danger Zone. Temperature range (40° F–140° F) within which most bacteria can grow and reproduce rapidly.

Virus. The smallest microbe that can make people sick. A virus needs a person or an animal in which to grow. Viruses are usually spread through unwashed hands. See microbes/microorganisms.

Note: Microbiological concepts can be difficult to grasp. The names of microorganisms are often long, hard to pronounce and sound similar to each other. Therefore, no specific microorganisms (such as Listeria or Salmonella for example) will be used in this curriculum.

The microworld includes four (4) categories of microorganisms. They are bacteria, viruses, parasites, and fungi. Keep in mind that not all microorganisms cause foodborne illness. Those that do are called pathogens. The most common causes of foodborne illness are viruses and bacteria. Throughout the curriculum, the authors have chosen to use the word "microbes" when talking about any of the microorganisms that cause foodborne illness and will also use the word "bacteria" when referring to that specific type of microorganism.

Depending on your students' comprehension, you may choose to use "harmful bacteria", "bacteria and viruses," "microorganisms," "microbes," or "pathogens" when referring to the microbes that make people sick.

Teaching Points

Opening Questions

1. Did you or a family member ever get sick from food that you ate?
Discuss what it means to get sick from food. What are some of the names of the illnesses students may have heard of (food poisoning, foodborne illness, salmonella or botulism).

2. How do microbes that can make us sick, get into our food?
Microbes can sometimes get into the food we eat if people are not careful when they handle, prepare or cook food. Raw food that comes from animals (meat, chicken, fish, eggs) can be contaminated with microbes. Raw fruits and vegetables may have microbes that come from the soil, water or wild animals.

3. How can we prevent people from getting sick from the food we prepare?
We can practice good personal hygiene including washing our hands before working with food. We can learn to buy, store, cook and chill foods safely and keep microbes out of the food we prepare.

Learn More About it

- Take a TOUR of the interactive house (www.stopgerms.org)
- Millions of germs and bacteria await kids at school (www.foodpoisonblog.com)
- Food/food safety games/clean the counter game (www.inspection.gc.ca)
- Meet the Microbes (www.microbeworld.org)
- Fight BAC! food safety campaign site (www.FightBAC.org)

Notes

- Most microbes cannot be seen with our eyes alone, only with a microscope.
- A small number of harmful bacteria can make a person sick.
- Not all microbes will make us sick. Some bacteria, (yeast) are used to make foods that we eat, including yogurt, bread, salami, and pickles.
- Microbes that can make us sick are more likely to be found in raw or uncooked meat, chicken, fish or eggs.
- Sometimes microbes can be found on fruits or vegetables that are grown in the garden or fields full of dirt.
- We cannot tell just by looking at food if it could make us sick. The microbes are just too small to see and you cannot smell them either.
- If we don't handle cooked food carefully and safely, harmful microbes can also end up in cooked food (if our hands are dirty, for example).
- Bacteria increase in number by dividing in two, then in two again. They grow very fast by multiplying this way.
- To grow, bacteria need food (nutrients), moisture (water), warmth (temperature), and time.
- Harmful microbes are more likely to be found on raw meat, fish, or eggs; raw fruits and vegetables; or on cooked or processed foods (such as pasteurized dairy products, cold cuts, cooked pasta, or roasted chicken if not handled safely).

How microbes get into the food:

- Animals and fish may carry microbes that can be in the soil they live on, the water they drink or live in, or the food they eat.
- Fruits and vegetables can be contaminated on the farm by microbes from the dirt, water from ponds or rivers, farm animals, air, birds and deer.
- People can have microbes on the hands, on their skin or in their mouth. The microbes can get onto food when people are harvesting on a farm; processing foods like hot dogs or frozen dinners; making or cooking food in a restaurant or in your own kitchen at home.
- Microbes can get into cooked foods that are sitting on a dirty counter, being passed around a table, or when people with dirty hands touch the food when serving or putting the food away.
- Foods most likely to support the growth of harmful microbes that can cause foodborne illness can be called, "Risky Foods."
  - Raw meat (pork, beef, lamb); fish and shellfish; poultry (chicken, turkey, duck); eggs and dairy foods (raw milk or raw eggs)
  - Cooked meat (except bacon), poultry, fish, shellfish, eggs, cold cuts, hot dogs.
  - Milk, cheese, yogurt, cottage cheese, sour cream
  - Cooked cereal (oatmeal, cream of wheat), rice, macaroni

- Cooked vegetables and beans
- Sliced raw tomatoes, melons (cantaloupe, watermelon)

Microbes/ microorganisms and temperature:

- Many microbes grow best at room temperature.
- Cooking or baking foods for the right amount of time until they are very hot will kill microbes.
- Cold temperatures will either slow the growth of microbes (as in a refrigerator) or stop them from growing (as in a freezer), but will not kill them (the exception to this is parasites, which are killed in the freezer).
- Keep the refrigerator at or below 40°F and the freezer at or below 32°F.
- The Temperature Danger Zone is the range of temperature (40°F to 140°F) that bacteria and other microbes grow/multiply the fastest. The temperature of the kitchens in our home is in the Danger Zone. Two or more hours in the Danger Zone can result in the growth of harmful microbes to make you sick.

Keep microbes/ microorganisms out of food:

- Wash hands and wear clean clothes when preparing food.
- Clean counters, cutting boards, and cooking utensils before preparing food and after preparing each different type of food.
- Don't work with food if you are sick or have an infection.
- Be sure to wash all fruits and vegetables before eating or when preparing to cook.
- Cooking foods until very hot will kill the microbes. Use a food thermometer to be sure that you r each the right end cooking temperature.
- Chill leftover foods as soon as you are finished eating.
- We cannot smell them.
- Bacteria can grow and duplicate or copy themselves very quickly.
- To grow they need the right food (nutrients), warmth (temperature), moisture (water) and time.

Student Activities

A-4 Growing Bacteria/Microbes
A-5 Double Trouble
A-3 Reflection Worksheet

Note: Pictures are included in a power point presentation (on CD #1) showing examples of bacteria grown on Petri dishes. Examples of bacterial growth on Petri dishes from various sources include: washed and unwashed fingers, coins, shoes, etc. These pictures could be used to illustrate the activity, especially if performing the activity is not feasible.

Student Activity A-4
Growing Bacteria/Microbes

Introduction

In this activity, which will take place over several days, students will see where bacteria live. Bacteria will be grown on nutrient agar. They will expose the agar to contamination from various surfaces, such as their hands, etc. Students will use the Bacteria/Microbes Record Sheet to keep track of the bacterial growth and finally, they will record their findings in the Bacteria/Microbes Journal.

Supplies

- Nutrient agar plates (one per student)
- Marker
- Tape
- A-4 Bacteria/Microbes Journal Worksheet

Directions

1. Under the teacher's direction, students will "contaminate" the agar plate. These are some of the possibile contaminates: fingers washed/unwashed, touch hair, touch clothes, touch coin, touch shoe bottom, air, touch desk, touch soil, touch face, touch windowsill.
2. Students will work in pairs or alone. Each student or group should have their own Petri dish containing nutrient agar.
3. Instruct students to label the bottom of the closed Petri dish with their name, date, and how they will be "contaminating" the dish. For instance, if they are to touch their washed fingers to the agar, then they should label the dish "washed fingers."
4. When students are ready to contaminate their agar, instruct them to remove the lid from the dish. They should touch whatever object they have been assigned and then firmly touch the agar surface with their fingers (being careful not press so hard they tear the agar).
5. If the students are supposed to wash their hands, have them wash thoroughly with soap for at least 20 seconds, rinse with warm water, and dry with a paper towel.
6. Students should then place the cover back on their dish, **tape the edges shut**, cover the dish as quickly as possible, turn the dish upside down and store it in a warm place. Have the students check their dish at the beginning and end of the school day. It should take 2–4 days for bacteria to grow on the contaminated agar. They should draw and write their observations on the Student Activity Worksheet, *Bacteria/Microbe Record Sheet,* **and** include the number of bacterial colonies that grew and what they looked like.
7. When the experiment is finished, instruct the students how to dispose of the contaminated Petri dishes.
8. Make a table on the board of the different contaminating surfaces and the amount of bacterial growth from each surface.

Note: Remember to cover all Petri dishes as quickly as possible and tape all dishes shut. Do not let students open the Petri dishes once they have been contaminated. Place all exposed Petri dishes in the warmest part of the room (i.e. near heat vent). The plates should be warm but not hot. Once the experiment is completed, chlorine bleach should be poured in the Petri dishes before discarding.

Notes

- If you want to use money, do not use dollar bills. They contain an antibacterial agent in them to keep bacteria from growing.
- Do not allow any student to spit or sneeze into the plates.
- Total plate count agar can be used in place of nutrient agar.
- Dispose of used plates by autoclaving until the petri dishes are "melted" and place in a trash bag for disposal. It would be best to contact a science teacher in your school for assistance.

How do you get nutrient agar plates?

Pre-poured, sterile Petri dishes can be purchased from scientific supply companies (e.g. Nebraska Scientific 1-800-228-7117) or the dishes and agar can be purchased separately. If you choose empty Petri dishes, you will have to prepare the plates yourself. Directions are available

when you purchase the agar. See below for cost of supplies from Nebraska Scientific and from other sources available on the Web:

Sterile Petri dishes	25/pkg $ 7.95 or 100/pkg $24.95	
Agar dishes	10/pkg $20.00 or 20/pkg $39.00	
Agar pre-poured dishes	10/pkg $17.50	www.onlinesciencemall.com
Petri dishes and agar culture	20/pkg $18.99	www.auspexscientific.com
Petri dishes with agar	3/pkg $ 7.99	www.physlink.com

Other Sources

1. Science department in your school
2. Any local college may be able to prepare the small number of agar plates needed to conduct this activity. This would be the best way.
3. The last option would be to use Petrifilm which is available from the 3M Company (1-800-328-6553). Ask for Petrifilm aerobic count plates and mention that this is for a school project. These are different then Petri dishes as they look like thin papers. These are ready-to-use and contain dry media and gel that are coated on thin films. These are "contaminated" by lifting the clear top film and touching the bottom portion. If you use these, a small amount of boiled/cooled water (approximately 1 milliliter) will have to be placed on the Petrifilm before the students touch the film OR the student can touch the film directly onto the surfaces. Store as above. Allow one Petrifilm with just the water on it as a "control."

Adapted from: *Food Safety House, Food Safety Education Curriculum for Grades 1–6,* 1999

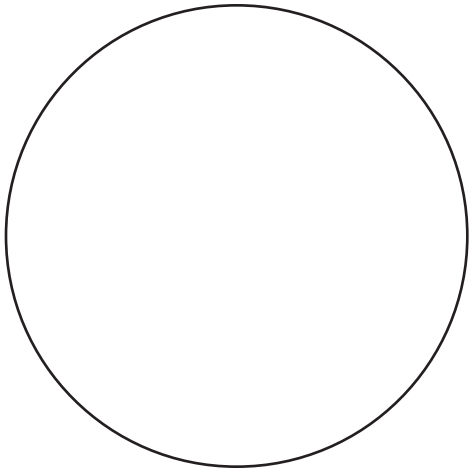
Bacteria/Microbe Record Sheet

Directions
Students sould check the Petri dishes at the beginning and end of each school day after the plates are prepared. It should take 2–4 days for bacteria to grow on the contaminated agar. Students should draw and write their observations on the Bacteria/Microbe Record Sheet, and include the number of bacteria colonies that grew and what they looked like. This may be done as a group activity with circles (plates) drawn on the board or a fllip chart. Students can record each day how the Petri dish appearances change from day to day.

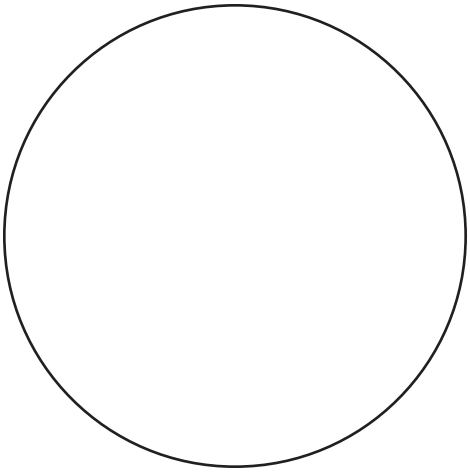
Student name: _____

Date plate contaminated: _____ **What contaminated plate:** _____

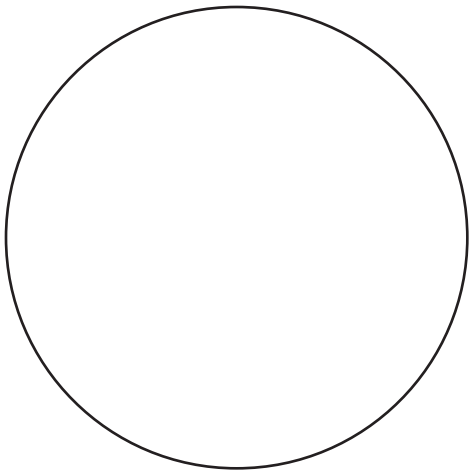
Day 1. Date:



Day 2. Date:



Day 3. Date:



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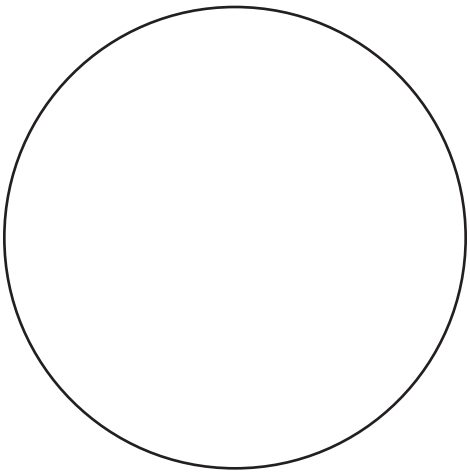


Adapted from: *Food Safety House, Food Safety Education Curriculum for Grades 1–6,* 1999

Student Activity A-5
Double Trouble

Introduction

In this activity, students will see how fast bacteria can multiply, using grains of uncooked rice (or lentils if a larger item would work better). Use the attached picture or a real checkerboard if preferred.

Supplies

- 1 small box of rice (or bag of lentils)
- Checkerboard handout (or regular checkerboard)
- Clock or watch
- A-5 Double Trouble Worksheet

Directions

1. Note the time on a clock or watch.
2. Place 1 grain of rice on the first square of the checkerboard.
3. For each square after that, place double the number of grains of rice than the previous square. (in the second square place 2 grains of rice, in the third square place 4 grains of rice, in the fourth square place 8 grains for rice and in the fifth square place 16 grains of rice.
4. Continue doubling the number of grains of rice in each square until you can fit no more!
5. Check the time on the clock.
6. Ask students how many grains are in the last square filled. At what point does it get hard to fit the grains in a square. How much time passed while the "bacteria" were "multiplying?"

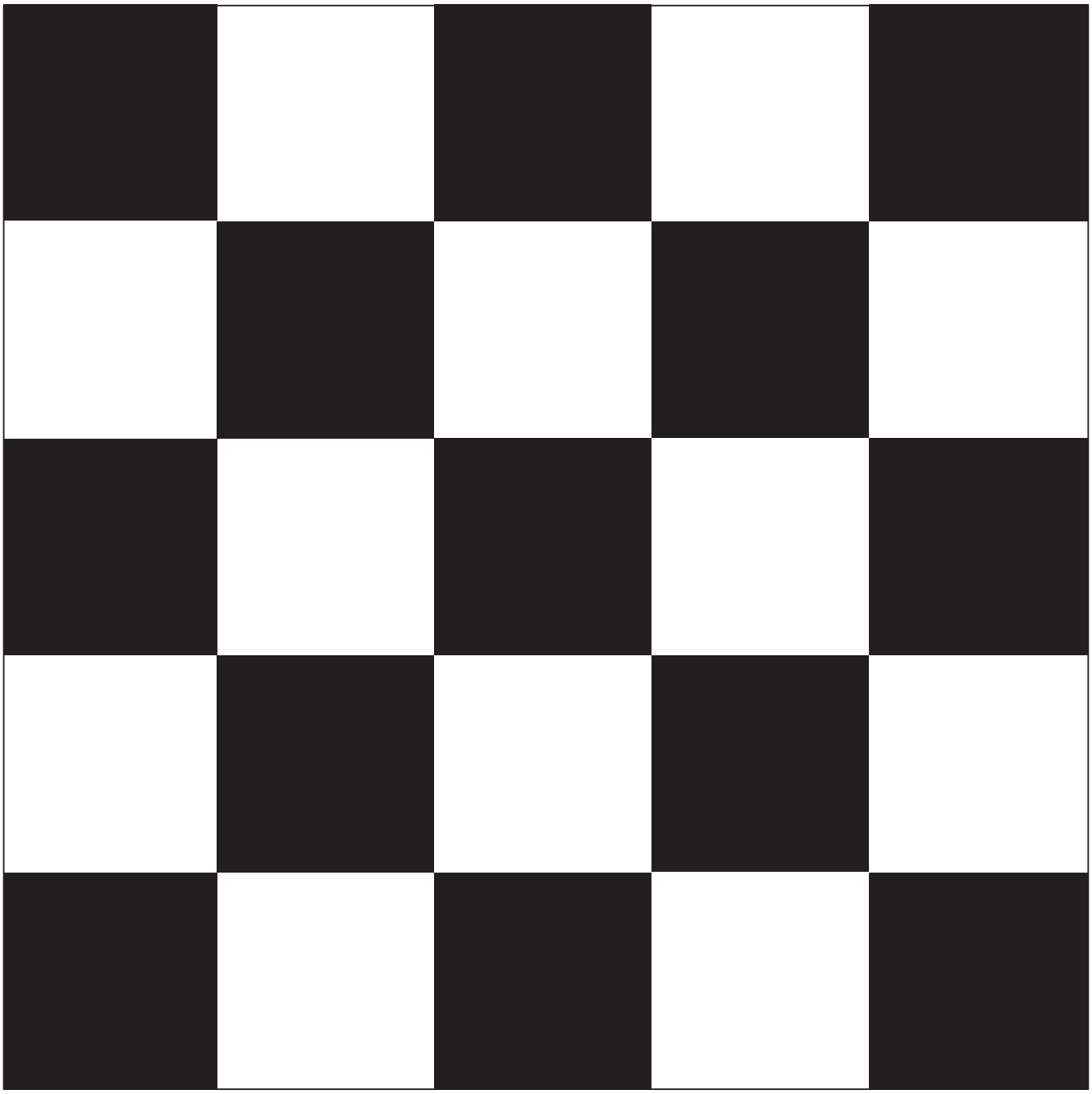
Note

- It does not take much time for bacteria to multiply to very large numbers.

Student Activity A-5

Adapted from: *Food Flies and Fungus, Exploring Food Safety: A 4-H Food Safety Curriculum* for grades 5–8.

Student Activity A-5
Double Trouble Checkerboard



Student Activity A-5
Double Trouble Worksheet

Date: _____

Student name: _____

1. Record the time when the first grain of rice was placed on the first square.

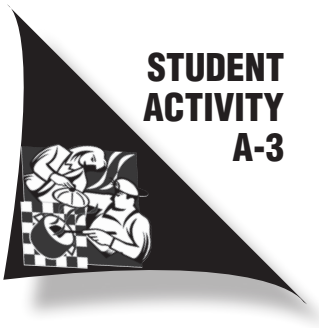
2. Record the time when the last grain was placed on the last square on the checkerboard.

3. How many grains of rice were there on the last square filled?

4. How long did it take for the “bacteria” to multiply?

5. What could you do to prevent “bacteria” from multiplying?

Student Activity A-3
Reflection Worksheet



1. What have you learned from this lesson?

2. What changes do you plan to make in your food safety practices based on the results of this lesson?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

Unit 2 Lesson 1

The Microworld Post Test

Student Name: _____

Directions

Below is a list of statements describing food safety issues. Please indicate whether you think the statement is Yes (Y) or No (N) by circling either Y or N. If you don't know (DK) the answer, please circle DK.

Unit 2		Yes	No	Don't Know
1.	It could take only a small number of harmful bacteria to make a person sick.	Y	N	DK
2.	All bacteria found in food can make you sick.	Y	N	DK
3.	Microorganisms are so small you can't see them with just your eyes.	Y	N	DK
4.	You can see, smell and/or taste when food is unsafe.	Y	N	DK
5.	Bacteria need food and water to survive.	Y	N	DK
6.	Most microorganisms multiply most rapidly when the food is in the refrigerator.	Y	N	DK
7.	People may have harmful bacteria on their hands.	Y	N	DK

Unit 2 Lesson 1

The Microworld Post Test Scoring Guide

Directions

For statements below, the correct answers have been boxed. A correct answer is given one (1) point; an incorrect answer or "don't know" is given zero (0) points.

Unit 2		es	No	Don't Know
1.	It could take only a small number of harmful bacteria to make a person sick.	[Y]	N	DK
2.	All bacteria found in food can make you sick.	Y	[N]	DK
3.	Microorganisms are so small you can't see them with just your eyes.	[Y]	N	DK
4.	You can see, smell and/or taste when food is unsafe.	Y	[N]	DK
5.	Bacteria need food and water to survive.	[Y]	N	DK
6.	Most microorganisms multiply most rapidly when the food is in the refrigerator.	Y	[N]	DK
7.	People may have harmful bacteria on their hands.	[Y]	N	DK

Fight Bac Principle: Clean

Keep It Clean Overview

Introduction

The most important way to prevent people from getting sick from food is to be sure that anything that comes in contact with food, including hands, clothing, food preparation and serving, and clean-up areas, kitchenware, utensils, plates, glasses, etc. are clean.

During this lesson we will learn how to keep food safe by keeping clean anything that will be touching food, including counters, hands, pots, pans, or utensils. The activities included in this lesson can be done either in a traditional classroom or one with full kitchen facilities. Student activities more suited to a foods lab are noted.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Lesson Outcomes

Students will:
1. Understand how good personal hygiene practices can prevent foodborne illness.
2. Understand how proper cleaning and sanitizing of food preparation and storage areas can prevent foodborne illness.

Essential Vocabulary

Clean. To remove all dirt and bits of food that you can see from dishes, countertops, cutting boards and other food contact surfaces. Cleaning is NOT the same as sanitizing. See food contact surface; sanitize.

Foodborne illness. Sickness caused by eating contaminated food. Some people call it "food poisoning." See contamination.

Hand washing (technique). Hands should be washed with warm water and soap for at least 20 seconds while rubbing hands together. Wash hands in order to prevent spreading of microbes from the hands to food. Hands should be rinsed with warm water and then dried with a disposable towel. Always wash hands between tasks, after touching a pet, going to the bathroom, etc.

Microbes/Microorganisms. These very tiny living things can only be seen through a microscope. They include bacteria, viruses and fungi. Some may be harmful to people and others are helpful. Harmful microbes that can make people sick are called pathogens or harmful bacteria. See bacteria; virus; parasite; fungi.

Personal hygiene. Keeping yourself clean by having good health habits, such as bathing, washing hair, wearing clean clothes and washing hands often.

Learn More About it

- Parent/Teacher/Media section (www.scrubclub.org)
- Home, About SNAP and Clean Hands Statistics (www.itsasnap.org)
- Don't Get Caught Drty Handed (www.washup.org)
- Fact Sheets/Safe Food Handling, *Cleanliness Helps Prevent Foodborne Illness* (www.fsis.usda.gov)
- Fight BAC! food safety campaign site (www.FightBAC.org)

Teaching Points

Opening Question

Why is it important to keep your hands clean?

It is important to keep your hands clean because you cannot see, smell or feel bacteria. Bacteria (microbes/microorganisms) are everywhere and can be easily transported to food and people.

Notes

- Harmful microbes that cause foodborne illnesses are everywhere: in the air, in the soil or dirt, in non-drinkable water, on your hands and the skin of animals, inside our bodies and the bodies of animals.
- Harmful microbes that cause foodborne illness cannot be seen because they are so small that you would need a microscope to see them.
- Microbes can be spread to food by people with dirty hands, by people who cough and sneeze on food, or by people who are sick.

- Microbes can be spread from food to food when a contaminated food touches a non-contaminated food. When raw meat or fish touches salad greens or a slice of bread during preparation, bacteria may be spread from the meat to the salad.
- Microbes can be spread from dirty cooking utensils, pots, pans, dishes and glasses to people and food. If you cut up raw chicken on a cutting board and do not wash the board or the knife before slicing a tomato, bacteria from the chicken may contaminate the tomato.
- To remove microbes that cause foodborne illness from your hands, wash them with soap and running warm water for at least 20 seconds.
- When hands are clean, you are not as likely to get sick or spread harmful microbes that can cause foodborne illness.

Preview Still Picture Photo File, Clean #1-10.

Review Chapter 3, *Preparation,* and Chapter 7, *Clean Up,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activities

A-6 Handwashing Scorecard
A-7 How Do We Wash Our Hands?
A-8 Handwashing RAP/Song
A-9 Water and Oil: Do they mix?
A-10 Keep It Clean: What's wrong with this picture?
A-11 Keep It Clean: Kitchen Surfaces
A-12 Keep It Clean: Cleaning Up Spills
A-13 Clean UP: Recipes for Success
A-3 Reflection Worksheet

Hand Washing

Introduction

Hand washing is the most important activity you can do to keep from getting sick. If hands are not washed often and well, microbes can spread directly from one person to another or to food or onto surfaces that are touched; such as utensiles and other food contact surfaces.

Lesson Outcome

Students will be able to effectively wash their hands.

Essential Vocabulary

Bacteria. Tiny living things that are not animals or plants. Unlike parasites and viruses, bacteria grow in food. You can only see them through a microscope, and you can not smell or taste them. Some bacteria are helpful, otheris bacteria can cause sickness. The bacteria that cause sickness are often called pathogens or harmful microbes. See *microbes/microorganisms.*

Clean. To remove all dirt and bits of food that you can see from dishes, countertops, cutting boards and other food contact surfaces. Cleaning is NOT the same as sanitizing. See *food contact surface; sanitize.*

Microbes/Microorganisms. These very tiny living things can only be seen through a microscope. They include bacteria, viruses and fungi. Some may be harmful to people and others are helpful. Harmful microbes that can make people sick are called pathogens or harmful bacteria. See bacteria; virus; parasite; fungi.

Virus. The smallest microbes that can make people sick. A virus needs a person or an animal in which to grow. Viruses are usually spread through unwashed hands. See *microbes/microorganisms.*

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Learn More About it

- Parent/Teacher/Media section (www.scrubclub.org)
- Home, About SNAP and Clean Hands Statistics (www.itsasnap.org)
- Don't Get Caught Drty Handed (www.washup.org)
- Play the BAC! game on Fight BAC website (www.FightBAC.org)

Teaching Points

Opening Questions

1. **Why is hand washing important in keeping food safe?**
   Bacteria are easily spread from hands to food and people. By keeping hands clean with proper hand washing you can greatly reduce the chance of spreading harmful bacteria.
2. **Why should you use a paper towel to dry hands and throw it away?**
   By using a disposable paper towel you stop the spread of harmful bacteria.

Notes

- Hand washing is the most important activity you can do to prevent the spread of any disease especially foodborne illness.
- Think about all the things you have touched today. By frequently washing your hands the right way, you'll wash away harmful microbes.

You should always wash your hands:

- After using the bathroom;
- After touching a pet;
- After blowing your nose or sneezing into your hand;
- After touching a cut;
- After playing or working outside;
- After taking out the garbage;
- Before eating or preparing your food!
- When your hands get dirty while preparing food because you touched raw meat, sneezed into your hand, or touched anything dirty.

How do you wash your hands?

- Use warm water to wet hands.
- Use soap to loosen the dirt on your hands.
- Rub hands together to make a soapy lather and count to 20. You need 20 seconds to properly wash your hands. Note: Twenty (20) seconds is easy to count if you sign a simple song to yourself. "Happy Birthday to You," Row, Row Your Boat," and "Twinkle, Twinkle Little Star" are somes songs that take 20 seconds to sing, if you sing them through twice.
- Rinse hands under warm running water.
- Dry hands with a clean paper towel.

Review Still Picture Photo File, *Clean #1, 2, 3, 3b, 10.*

Review Chapter 3, *Preparation,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activities

A-6 Handwashing Scorecard
A-7 How Do We Wash Our Hands?
A-8 Write your own Handwashing RAP
A-9 Water and Oil: Do They Mix?
A-3 Reflection Worksheet

Keep It Clean: Clothing

Introduction

Dirty clothing can bring dirt and bacteria into food preparation areas. Wearing clean clothes helps to prevent this. It is often a good idea to wear a clean or disposable apron over clean clothes. Clean aprons help to stop dirt and bacteria from getting onto clothes and they can be removed easily for washing or thrown away if disposable.

In addition to clean clothing, it is good practice to keep hair tied back so that it does not fall into food. Jewelry and watches can also harbor and spread dirt and harmful bacteria into food.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Lesson Outcome

Students will understand the role that clean clothing plays in preventing foodborne illness.

Essential Vocabulary

Personal hygiene. Keeping yourself clean by having good health habits, such as bathing, washing hair, wearing clean clothes and washing hands often.

Ready-to-eat food. Foods that are not cooked or prepared any more before we eat them. Breads, cooked meats, sandwiches, soups, and salads are ready-to-eat foods.

Teaching Points

Opening Question

Is it okay to wear a dirty apron while preparing food?

Harmful bacteria can be easily transferred from dirty clothing to hands, food and work surfaces. It is important to keep clothing clean when working with food and when serving food.

Review Chapter 3, *Preparation,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Notes

- Clean clothing is essential to stop the spread of harmful bacteria.
- Harmful bacteria can hide on dirty clothes and aprons.
- Wear limited jewelry, including body piercing(s), Jewelry can harbor harmful bacteria and/or fall into the food.
- Tie hair back.
- Use utensils to handle any ready-to-eat foods.
- Nail polish or fake fingernails may easily fall into food.
- Wiping clean hands on a dirty apron can spread microbes from the apron to hands being used to prepare food.

Student Activities

A-9 Keep It Clean: What's Wrong With This Picture?
A-3 Reflection Worksheet

Keep It Clean
Surfaces, Utensils and Storage Areas

Introduction

Keeping food preparation and serving areas clean is a major factor in preventing foodborne illness. To ensure safe food handling, everything that comes in contact with food (countertops, utensils, desks, etc.) must be kept clean.

Lesson Outcomes

Students will:
1. Understand why all food preparation areas must be kept clean.
2. Will be able to clean work surfaces, utensils and dishes used to prepare and serve food.
3. Keep food storage areas clean.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Essential Vocabulary

Clean. To remove all dirt and bits of food that you can see from dishes, countertops, cutting boards and other food contact surfaces. Cleaning is NOT the same as sanitizing. See *food contact surface; sanitize.*

Teaching Points

Opening Questions

Why is it important to keep areas where food is prepared clean?
We have learned that bacteria are everywhere. Food contact surfaces (cutting boards, counter tops, etc.) if not kept clean can contaminate food with harmful microbes. Keep counters and cutting boards clean to reduce the risk of making someone sick from the food you prepare.

Why is it important to keep utensils and dishes used to prepare and serve food clean?
Dirty utensils and dishes (knives, ladles, serving plates, etc.) if not kept clean can contaminate food with harmful microbes. Keep utensils and dishes clean to reduce the risk of making someone sick from the food you prepare and serve.

Learn More About it

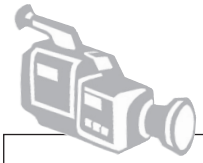
- Fact Sheets/Safe Food Handling, *Cleanliness Helps Prevent Foodborne Illness* (www.fsis.usda.gov)

Notes

- Review Unit 2, Lesson 1, The Microworld, focusing on what bacteria need to grow.
- Review personal hygiene—clean hands/clean clothes. Clean is the process of removing food and other types of soil from a surface.
- Surfaces where food is prepared should always be cleaned with hot water and soap and rinsed with hot water.
- Microbes are everywhere: If we do not clean well, microbes will be transferred from dirty counters, utensiles, or hands.
- Keep surfaces and utensils clean. If surfaces and utensils are not cleaned well after use, bacteria are able to live and grow on the dirty utensils and counter tops. The next time food is prepared on the countertops, eaten from unclean dishes, or served with the unclean utensils, foodborne illness could result.
- Clean counters with soap and warm water to remove visible dirt and particles, rinse with hot water and air dry.
- Sponges and/or dishcloths used to wipe up juices from raw meat, fish, or poultry should not be used to wash dishes. The best practice for cleaning up juices from raw meat would be to use a paper towel that can be disposed of after wiping the counters.
- A cloth towel used to clean up spills on kitchen counters should not be used to dry off fresh vegetables. After washing fresh vegetables thay should be dried with a clean cloth or clean paper towel.
- Clean cutting boards and utensils in the dishwasher where temperatures are high enough to kill microbes. Or, if washing by hand, wash with hot water and soap, rinse with hot water, and air dry. Drying with a cloth towel just "moves the microbes around."

Note: As the curriculum targets consumers' practices in their homes, sanitizing with chemicals such as chlorine bleach is not addressed. More information on all aspects of sanitizing may be found in the Appendix section on the *Food Service Application of the Curriculum*. However, research has shown that, in general, household dishwashers do an adequate job of cleaning dishes, glassware, utensiles, etc. The majority of household dishwashers have temperature booster units that increase the water temperature in the wash and rinse cycles to a high enough temperature to adequately and thoroughly clean dishes, glassware, and utensiles.

- Clean can openers after each use as they can also be the source of harmful bacteria (because food may collect on the cutting surfaces and bacteria can live and grow there).



Review Chapter 7, *Clean Up,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

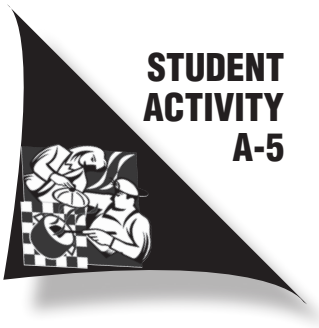
Keep Pets Away

Pets carry harmful microbes that can make people sick.

- Keep pets away from food preparation areas.
- Keep pets off counters and tabletops.
- Keep pets away when food is being prepared.
- Keep pets away when food is being served and eaten.

Student Activities

A-11 Keep It Clean: Kitchen Surfaces
A-12 Keep It Clean: Cleaning Up Spills
A-13 Clean-Up: Recipes for Success
A-3 Reflection Worksheet



Student Activities

Unit 3 Fight Bac Principle: Clean

Lesson 1 Keep It Clean: Overview

A-6 Handwashing Scorecard
A-7 How Do We Wash our Hands?
A-8 Handwashing RAP/Song
A-9 Water and Oil: Do They Mix?
A-10 Keep it Clean: What's Wrong with This Picture?
A-11 Keep It Clean: Kitchen Surfaces
A-12 Keep It Clean: Cleaning Up Spills
A-13 CleanUp: Recipes for Success
A-3 Reflection Worksheet

Lesson 2 Handwashing

A-6 Handwashing Scorecard
A-7 How Do We Wash our Hands?
A-8 Handwashing RAP/Song
A-9 Water and Oil: Do They Mix?
A-3 Reflection Worksheet

Lesson 3 Keep It Clean: Clothing

A-10 Keep it Clean: What's Wrong with This Picture?
A-3 Reflection Worksheet

Lesson 4 Keep It Clean: Surfaces, Utensils, and Storage Areas

A-11 Keep It Clean: Kitchen Surfaces
A-12 Keep It Clean: Cleaning Up Spills
A-13 Clean-Up: Recipes for Success
A-3 Reflection Worksheet

Student Activity A-6
Handwashing Scorecard/Survey

Introduction

Students will administer a Handwashing Scorecard to select an audience (i.e. fellow students, family members).

Supplies

- Handwashing Scorecard
- Pencils
- Clipboards
- A-6 Handwashing Scorecard Worksheet

Directions

1. Help students decide who they would like to involve in this scorecard activity (i.e. fellow students, parents/caregivers, family or teachers in the school). Have each student be responsible for one scorecard. (Note: It may be necessary to obtain permission from school administration to post the scorecard if it will be used in the school. Be sure to check ahead of time.)
2. It might be useful to laminate the scorecards to make them easier to use in an area where water might be splashed on them.
3. Ask students to post the chart near the sink in the kitchen or bathroom of their house and to encourage family members/caregivers to fill it out over a one week period. Another option may be to have students observe other students in their school or classroom and record results.
4. Distribute copies of the survey, clipboards and pencils, and review the survey with students.
5. Provide students with a timeline to conduct the survey. When the surveys are returned, students compare their findings in small groups. They can make generalizations according to the age of the respondents and develop charts, graphs or other visuals to compare and contrast their findings. Students can then share these visuals with the class.

Adapted from: The Partnership for Food Safety Education (www.fightbac.org)

Handwashing Scorecard

Date	Name	When hands were washed

Student Activity A-7
How Do We Wash Our Hands?

Introduction

During this activity, students put the steps to handwashing in the correct order. They are also asked why handwashing is one of the most important activities to prevent foodborne illness. This activity may be done as an individual, small group or class exercise.

Supplies

- Picture, Clean #1, #2, #3, #6 from Picture File
- A-7 How Do We Wash Our Hands worksheet

Directions

1. Review information presented in the unit lesson on why proper handwashing is important.
2. Give students the necessary still pictures on the handwashing steps.
3. Have the students put the pictures in order.
4. Discuss with students why they placed them in that particular order and review the correct handwashing steps.
5. Show video clip of correct handwashing to reinforce the concept.

Handwashing Worksheet

1. Place the pictures of he handwashing steps in the correct order and list them below.

2. Why did you list them in that order?

Student Activity A-8
Handwashing Song or RAP

Introduction

During this activity, students will write a 20-second song that could be sung while washing hands. This activity could be done either by individual students or by groups of students.

Supplies

- A-8 Write Your Own Handwashing Song or RAP worksheet
- Variety of music that RAP/song could be sung to.

Directions

1. Discuss with students the correct handwashing steps and list them on the board.
2. Explain the activity and give students ideas of what types of music they could use to set their lyrics to.
3. After students have completed the assignment, have selected students sing or read their RAP/ songs.

Handwashing Song or RAP Worksheet

Below write your own handwashing song or RAP.

Student Activity A-9
Oil and Water: Do They Mix?

Introduction

In this activity, the students will see that it is important to wash their hands. It will demonstrate that hands should be washed with warm water and soap and also with hands being rubbed together. This activity can be done in small groups or as a classroom demonstration.

Supplies

- Three, 8 oz. clear glass, straight-sided canning jars (no lip or rim) with covers
- Liquid dishwashing detergent
- One, 1-cup liquid measuring cup
- Warm water
- 1/2 teaspoon measuring spoon
- 1 teaspoon measuring spoon
- Vegetable oil
- A-9 Oil and Water: Do They Mix? Worksheet

Directions

Review the importance of proper handwashing, in particular the necessity of using warm water and soap. Ask students to record their observations on the A-9 Oil and Water: Do They Mix? Worksheet.

Label the jars 1–3. Pour one cup (using the liquid measuring cup) of warm water into each jar.

JAR 1

1. Add only 1 teaspoon of vegetable oil to the water.
2. Cover the jar and shake from side to side briefly.
3. Remove cover and monitor the time it takes for the water to clear and the oil to begin float-ing at the surface.

Observation: At first the water will be cloudy after mixing. After standing about 2–3 minutes, the oil should be floating on the top of the water. When looking at the glass from the top, students should see that the oil is separate from the water. They do not mix!

JAR 2

1. Gently add 1 teaspoon of vegetable oil and 1/2 teaspoon of liquid detergent.
2. DO NOT SHAKE the jar. Place on the table.
3. Have the students describe what they see when looking at the jar from the top.

Discussion Questions

Does the oil ever mix with the water with the water when the soap is there and the jar is not shaken? Why?

JAR 3

1. Add 1 teaspoon of vegetable oil and 1/2 teaspoon of liquid detergent.
2. Cover the jar and shake it from side to side strongly for a short time.
3. Remove the cover and have the students monitor the time it takes for the oil to rise to the surface of the water.
4. Let the jar stand for 30 minutes.

Observation: The water will become cloudy after mixing. After standing for about 30 minutes, the water still remains cloudy and there is no oil at the water's surface.

Discussion Questions

1. What happens to the mixture after 30 minutes?
2. Based on the results of this activity, why is it necessary to use both soap and warm water to thoroughly clean dishes, utensils and other items used to prepare and serve food?

Adapted from: *Food Safety House, Food Safety Education Curriculum for Grades 1–6*

Oil and Water: Do They Mix? Worksheet

Directions
Label the jars 1–3. Pour one cup (using the liquid measuring cup) of warm water into each jar.

JAR 1

1. Add only 1 teaspoon of vegetable oil to the water.
2. Cover the jar and shake from side to side briefly.
3. Remove cover and monitor the time it takes for the water to clear and the oil to begin float-ing at the surface.

Discussion Question
What happens to the oil?

JAR 2

1. Gently add 1 teaspoon of vegetable oil and 1/2 teaspoon of liquid detergent.
2. DO NOT SHAKE the jar. Place on the table.
3. Have the students describe what they see when looking at the jar from the top.

Discussion Questions
Does the oil ever mix with the water with the water when the soap is there and the jar is not shaken? Why?

JAR 3

1. Add 1 teaspoon of vegetable oil and 1/2 teaspoon of liquid detergent.
2. Cover the jar and shake it from side to side strongly but briefly.
3. Remove the cover and have the students monitor the time it takes for the oil to rise to the surface of the water.
4. Let the jar stand for 30 minutes.

Observation: The water will become cloudy after mixing. After standing for about 30 minutes, the water still remains cloudy and there is no oil at the water's surface.

Discussion Questions
1. What happens to the mixture after 30 minutes?

Based on the results of this activity, why is it necessary to use both soap and warm water to thoroughly clean dishes, utensiles, and other items used to prepare and serve food?

Student Activity A-10 Keep It Clean: What's Wrong with This Picture?

Introduction

The purpose of this activity is to help students understand the importance of wearing clean clothing when preparing food.

Supplies

- Video-chapter #3, *Preparation* or picture, *Clean #4*, from the still picture file, wearing dirty clothing while preparing food.
- Video-chapter #3, *Preparation* or picture, *Clean #5*, from the still picture file, wearing clean clothing while preparing food.
- A-10 Keep It Clean: What's Wrong With This Picture? Worksheet

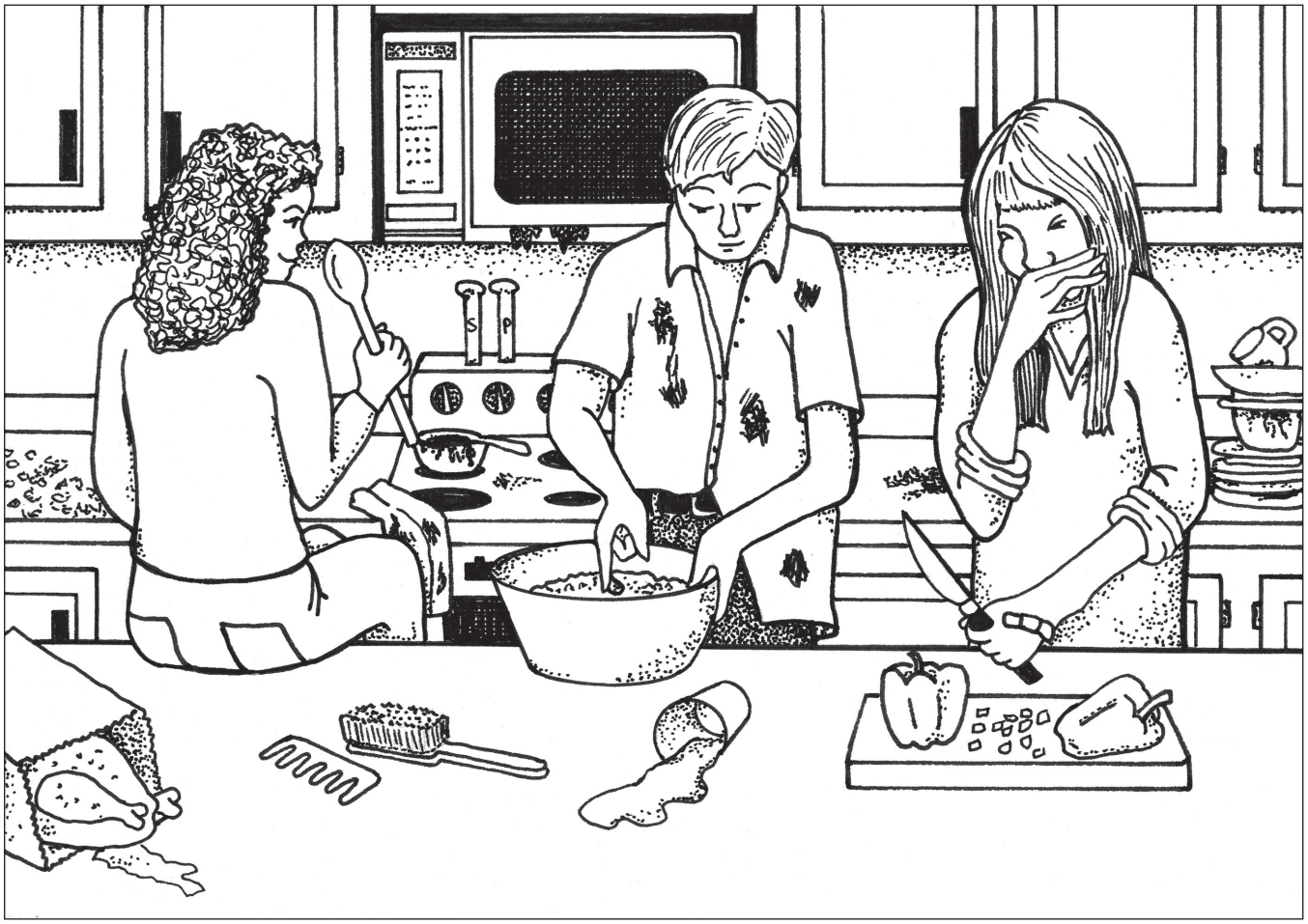
Directions

1. Ask students to list why the student in the video is not "food safety smart." You can either write the list on the board or have the students write their answers on the A-10 What's Wrong With This Picture? Worksheet.
2. Discuss the reasons why, based on the information presented in the lesson:
   - Clothing can harbor harmful bacteria that could make us sick.
   - This student has been out playing basketball. This is one place where we find the bacteria that could make us sick.
   - He is touching his clothing then touching the dishes, etc. that we are going to eat from.
   - What should this student have done before he started to help prepare food?
3. Show picture, *Clean #5*/Video-clip (scene #3,*Preparation*) of student in clean clothing getting ready to help prepare the meal.

Adapted from: *Looking for a Safe Harbor, A Food Safety Education Curriculum for Volunteer Foodservice Workers,* www.uri.edu/ce/ceec/food/volunteer.html

What's Wrong with This Picture?

Directions
List why the students in this picture are not "food safety smart."



Student Activity A-11
Keep It Clean: Kitchen Surfaces

Introduction

These activities may be done as a follow-up to the lesson or in place of Lesson 4, Keep it Clean: Surfaces, Utensiles, and Storage Areas.

Supplies

- Still pictures *Clean #6a–8c/Video chapter #7 (Clean-Up)* showing how to clean areas of the kitchen including the correct way to clean-up spills.
- A-11 Keep It Clean: Kitchen Surfaces Worksheet.

Directions

1. Ask students to list why the student in the video is not food safety smart. You can either write the list on the board or have the students write them on A-11 Keep It Clean: Kitchen Surfaces Worksheet.
2. Discuss the reasons why, based on the information presented in the lesson:
   - After we prepare raw meat, fish or poultry for cooking, what is left on the counter? There may be some meat juices on the counter that could contain some bad bacteria that could make us sick.
   - These juices could get onto other foods that require no cooking, and when we eat those foods we could also be eating those juices. This could make us sick.
3. Show still pictures, *Clean #6a–8c,* Video chapter 7, *Clean Up*, which illustrates a student correctly cleaning up spills and the counters.

Keep It Clean: Kitchen Surfaces Worksheet

Directions
List why the student in the video is not "food safety smart."

Student Activity A-12
Keep It Clean: Cleaning Up Spills

Introduction

During this activity students will learn the correct order of cleaning up spills and counters. This activity can be done as an individual, small group or class exercise.

Supplies

- Still pictures *Clean #7a,b* illustrating the steps to cleaning up spills on the counter and to the correct cleaning of the counter
- A-12 Keep It Clean: Cleaning Up Spills Worksheet

Directions

1. Give each student a set of the pictures showing the steps for cleaning up spills, and ask them to put them in the correct order and explain why.

2. Discussion Questions:
   - After we prepare raw meat, fish or poultry for cooking, what is left on the counter?
   - There may be some meat juices on the counter that could contain some bad bacteria that could make us sick.
   - These juices could get onto other foods that require no cooking and when we eat those foods we could eat those juices. This could make us sick.
   - How should we clean up these spills?
   - With a clean paper towel, wash the area with hot water and soap and let it air dry.

Student Activity A-12
Keep It Clean: Cleaning Up Spills Worksheet

Answer the questions below in the space provided

1. After we prepare raw meat, fish, or poultry for cooking, what is left on the counter?

2. How should we clean up these spills?

Student Activity A-13
Clean-Up Recipes for Success

Introduction

This activity is designed to be done in a foods lab setting. During this activity students will learn the correct order of cleaning up spills and counters. This activity can be done as an individual, small group, or class exercise.

Supplies

- Still pictures *Clean #6–8c /*Video chapter *(scene #7, Clean-Up)*
- A-13 Clean-Up: Recipes for Success Worksheet

Directions

1. Review the steps for cleaning up spills and countertops using either the video chapter or pictures. Post the pictures of the steps in the correct order in the classroom and/or write the steps on the board.

   Discussion Questions:

   - After we prepare raw meat, fish or poultry for cooking, what is left on the counter? There may be some meat juices on the counter that could contain some bad bacteria that could make us sick.
   - These juices could get onto other foods that require no cooking. If we eat the ready-to-eat foods we could get sick.

2. Distribute copies of the A-13 Clean-Up: Recipes for Success Worksheet. There are two recipes provided—baked chicken and lasagna.

3. Have the students use the student activity sheet to list the clean-up steps that should be added to each step in the recipe.

Student Activity A-13
Clean-Up: Recipes for Success Worksheet

Directions

In the spaces after each step in the baked chicken recipe list the clean-up steps that should be added to each step in the recipe.

Baked Chicken

Serves: 4

Ingredients:

4 chicken breasts
"Coating" mixture of one cup flour, 1 tsp onion powder, 1/4 tsp pepper, and 1 tsp paprika
Large plastic bag
Oil or spray oil

Preparation:

1. Preheat oven 375° F.

---

2. Add "coating mixture" ingredients in a large plastic bag. Shake to combine.

---

3. Take chicken out of refrigerator, open package. Place chicken on cutting board, remove skin.

---

4. Use tongs or other cooking utensil to place chicken pieces in the bag.

---

5. Shake until all the chicken pieces are coated.

---

6. Use tongs or other cooking utensil to remove the coated chicken pieces and place in a 9" x 13" baking dish, cooking surface sprayed with oil or covered with thin coating of oil.

---

7. Bake 20–30 minutes until internal temperature reads 165° F.

Student Activity A-13
Clean-Up: Recipes for Success Worksheet

Directions

In the spaces after each step in the lasgna recipe list the clean-up steps that should be added to each step in the recipe.

Lasgna

Serves: 6

Ingredients:

8 oz. lean ground beef
1 cup chopped onion
2 cloves garlic, minced
1, 14-1/2 oz can low-sodium tomatoes, undrained, cut up
1, 6 oz. can tomato paste
1-1/2 tsp dried basil
1-1/2 tsp dried oregeno
1/4 tsp salt
9 dried lasagna noodles
1, 12 oz carton low fat cottage cheese
1-1/2 cups shredded low fat mozzarella cheese
1/4 cup parmesan cheese
1 egg
2 Tbs parsley
1/4 tsp pepper

Preparation:

1. Brown ground beef. Drain, add onions and garlic. Cook 5 minutes.

2. Stir in undrained tomatoes, tomatoe paste, basil, oregano, and salt.

3. Bring to boil, reduce heat. Simmer, covered for 15 minutes, stir occasionally.

4. Cook lasagna noodles according to package directions. Drain, rinse with cold water.

5. Combine cottage cheese, mozzarella cheese, egg, parsley, and pepper.

6. Layer one-third of the cooked noodles in a 3" x 9" baking dish. Spread with half of the filling. Top with one-third of sauce. Repeat layers. Top with remaining noodles and sauce. Sprinkle with remaining 1/2 cup mozzrella cheese.

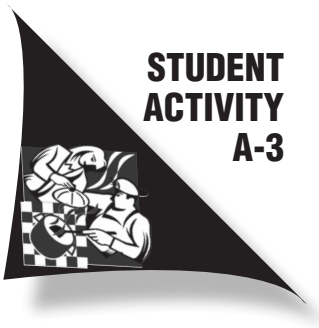
7. Tight cover pan with foil.

8. Bake at 350° F for 1 hour until it reaches an internal temperature of 165° F.

9. Remove pan from oven. Uncover and let stand for 15 minutes.

10. Serve.

Student Activity A-3
Reflection Worksheet



1. What have you learned from this lesson?

2. What changes do you plan to make in your food safety practices based on the results of this lesson?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

Clean Post Test

Student Name: _____

Directions

Below is a list of statements describing food safety issues. Please indicate whether you think the statement is Yes (Y) or No (N) by circling either Y or N. If you don't know (DK) the answer, please circle DK.

Unit 3		**Yes**	**No**	**Don't Know**
1.	You should wash your hands at least 15 seconds with warm water and soap before preparing food.	Y	N	DK
2.	It is important to wash hands after touching raw meat.	Y	N	DK
3.	Countertops should be cleaned before preparing food on them.	Y	N	DK
4.	After washing your hands it is okay to dry them on your apron.	Y	N	DK
5.	It is important to wash a cutting board after using it to cut up raw meat.	Y	N	DK
6.	It is safe to use a cloth towel to clean up spills on kitchen counters and then use it to dry off fresh vegetables.	Y	N	DK
7.	Sponges and/or dishcloths used to wipe up juices from raw meat, fish or poultry can be used to wash dishes if they have been rinsed in hot water.	Y	N	DK

Clean Post Test Scoring Guide

Directions

For statements below, the correct answers have been boxed. A correct answer is given one (1) point; an incorrect answer or "don't know" is given zero (0) points.

Unit 3		Yes	No	Don't Know
1.	You should wash your hands at least 15 seconds with warm water and soap before preparing food.	Y	[N]	DK
2.	It is important to wash hands after touching raw meat.	[Y]	N	DK
3.	Countertops should be cleaned before preparing food on them.	[Y]	N	DK
4.	After washing your hands it is okay to dry them on your apron.	Y	[N]	DK
5.	It is important to wash a cutting board after using it to cut up raw meat.	[Y]	N	DK
6.	It is safe to use a cloth towel to clean up spills on kitchen counters and then use it to dry off fresh vegetables.	Y	[N]	DK
7.	Sponges and/or dishcloths used to wipe up juices from raw meat, fish or poultry can be used to wash dishes if they have been rinsed in hot water.	Y	[N]	DK

Fight Bac Principle: Separate

Separate: Don't Cross Contaminate Overview

Introduction

Cross contamination can be a difficult concept for students to grasp. Cross contamination happens when harmful microbes are passed from contaminated food, dirty utensils, hands, counters, or equipment to another food item or to clean hands, utensils, or food preparation surfaces. Harmful microbes may be in raw meat or chicken juices, dirty utensils, cutting boards or dirty hands.

The information presented in this lesson can be done either in a traditional classroom or one with full kitchen facilities. Student activities more suited to a foods lab are noted.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Lesson Outcomes

Students will be able to identify how food is contaminated during food preparation and ways to prevent cross-contamination.

Essential Vocabulary

Contamination. When harmful microbes, chemicals, or foreign objects get into food, either naturally or by accident. Food that has been contaminated can make people sick and is not safe to eat.

Cross contamination. When harmful microbes are passed from one food or object to another foos or object. The microbes can be passed by dripping food juices, by dirty utensils, cutting boards or equipment, and by food workers' hands. See *utensil.*

Food contact surface. Any part of equipment, utensils, dishes, cutting boards, containers, or wrappings that directly touches food. See *utensil.*

Learn More About it

■ Consumer Advice, Separate, Planning guides for food safety educators: *Separate-Combat Cross Contamination* and *Be Smart, Keep Foods Apart. Don't Cross Contaminate.* (www.foodsafety.gov)

Teaching Points

Opening Question

What would happen if you cut up a raw whole chicken, then prepared lettuce and tomatoes for a salad on the same cutting board, using the same knife?

If you cut up the lettuce and tomatoes for the salad on the same cutting board that you used to prepare raw chicken on, you would contaminate the lettuce and tomatoes with harmful microbes found on the raw chicken.

Review Chapter 3, *Preparation,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Notes

- Cross contamination happens when harmful microbes are passed from contaminated food (raw meat or chicken juices) or dirty utensils, hands, counters, dish towels, pot holders, or equipment to another food or to clean hands, utensils or other food contact surfaces.
- Cross contamination is how microbes are spread to foods or utensils that are not contaminated.
- Foodborne illness can be a result of cross contamination.

To avoid cross contamination during food preparation:

- Wash hands with soap and warm water before food preparation and after preparing raw meat, fish, poultry and raw vegetables.
- Wash utensils and surfaces with soap and hot water and rinse with hot water before and after food preparation, especially after preparing raw meat, fish, poultry, and raw vegetables.
- Wash the cutting board thoroughly between uses. This is most important when the same cutting board is being used to cut up raw meat, fish or poultry, and ready to eat salad items, fruit or cooked foods.
- Plastic (not wood) cutting boards can be put into the dishwasher. The hot water and steam during the rinse and drying cycles will serve to clean the board.
- Use clean sponges, dish cloths or paper towels when cleaning food-contact surfaces.

- Do not wipe hands on a dirty apron during food preparation.
- Use a clean spoon when tasting a food. Do not reuse a spoon that you have tasted from—wash with soap and water before using again.
- When grilling meat, fish, or poultry, never use the same plate that held the raw food to bring the cooked food to the table. Use a clean plate.
- If defrosting raw meat, fish, or poultry in the refrigerator, place the meat on a dish/tray large enough to catch dripping liquid. Store on the bottom shelf so that if drips occur, they do not contaminate other foods.

Student Activities

A-14 Pass the Apple
A-15 Travelin' Bugs
A-16 How Do Bacteria Get Around?
A-17 Set a :Food Safe" Table
A-18 Where Does It Go?
A-3 Reflection Worksheet

Fight Bac Principle: Separate

Don't Cross Contaminate: Setting the Table and Serving

Introduction

Cross contamination can be a difficult concept for students to grasp. Cross contamination happens when harmful microbes are passed from contaminated food, dirty utensils, hands, counters, or equipment to another food item or to clean hands, utensils, or food preparation surfaces. Harmful microbes may be in raw meat or chicken juices, dirty utensils, cutting boards or dirty hands.

Lesson Outcome

Students will learn how to identify how food and food contact surfaces can be contaminated when setting the table and serving food.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Essential Vocabulary

Contamination. When harmful microbes, chemicals, or foreign objects get into food, either naturally or by accident. Food that has been contaminated can make people sick and is not safe to eat.

Cross contamination. When harmful microbes are passed from one food or object to another foos or object. The microbes can be passed by dripping food juices, by dirty utensils, cutting boards or equipment, and by food workers' hands. See *utensil.*

Food contact surface. Any part of equipment, utensils, dishes, cutting boards, containers, or wrappings that directly touches food. See *utensil.*

Separate. Using different items between different tasks when preparing foods. For example, using one cutting board and knife when cutting fruits or vegetables and a different cutting board and knife when cutting meat, poultry, or fish. Separating helps to prevent cross contamination.

Review Chapter 3, *Preparation,* and Chapter 5, *Serving,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Teaching Points

Opening Questions

1. What is the correct way to handle silverware and cups when setting the table?

Always hold silverware by the handle. Do not touch the eating surface. Hold cups from the bottom or around the cup. Do not stick fingers into a cup to hold it.

2. What is the correct way to serve a plate of food?

When serving a plate of food do not touch the surface of the plate with your fingers. Serve the plate handling the edge of the plate so that you do not transfer microbes from your hands to the food.

Notes

- Cross contamination happens when harmful microbes are passed from contaminated food (raw meat or chicken juices) or dirty utensils, hands, counters, dish towels, pot holders, or equipment to another food or to clean hands, utensils or other food contact surfaces.
- Cross contamination is how microbes are spread to foods or utensils that are not contaminated.
- Foodborne illness can be a result of cross contamination.

To avoid cross contamination when setting the table:

- Clean the table with hot water, soap, and a clean sponge or dish cloth: allow to air dry.
- Wash hands with soap and warm water for 20 seconds and dry with a paper towel.
- Handle silverware by the handle—do not touch eating surfaces with bare hands.
- Handle cups or glasses by the bottom or around the glass—do not put fingers in glass or touch a cup where a person's mouth will touch.

To avoid cross contamination when serving food:

- Use clean serving utensils. Keep serving utensils in the food you are serving: do not set on counter or table.
- Do not serve a plate with your fingers touching the food—hold the plate by the rim or bottom.
- Pass serving dishes from the bottom or rim—do not put fingers into the dish.
- After grilling meat, be sure to to serve the meat on a clean plate—do not use the plate the raw meat was brought to the grill on. Use a clean serving utensil as well, the cooked food to the table. Use a clean plate.
- If defrosting meat, fish or poultry in the refrigerator on the bottom shelf, place the meat on a large enough dish/tray to catch the dripping liquid.
- One way cross contamination can occur is when food is served. To prevent this, never:
  - Serve a plate with your fingers touching any food on the plate.
  - Put your fingers inside the glass of milk, juice, water or soda, or a cup of tea, coffee or hot chocolate when you are serving.
  - Never touch the part of the silverware that goes in someone's mouth.

Student Activities

A-14 Pass the Apple
A-15 Travelin' Bugs
A-16 How Do Bacteria Get Around?
A-17 Set a "Food Safe" Table
A-3 Reflection Worksheet

Fight Bac Principle: Separate

Don't Cross Contaminate: Storage

Introduction

Remember, cross contamination happens when harmful microbes are passed from a contaminated food or object to another food or object. In a refrigerator, raw meat, poultry or fish juices can drip onto vegetables for a salad or fruit to be eaten for a snack. Raw foods that might be contaminated with microbes can also cross contaminate ready-to-eat foods in the refrigerator. Do not store non-perishable foods under the sink or in other areas where they might be contaminated with dripping water.

Kitchen chemicals can contaminate foods and make someone sick or cause illness. Soaps, cleaners, bleach, and bug spray must be stored separately from food, utensils, and food preparation areas. Always store kitchen chemicals below food contact surfaces to reduce the chance that the chemicals can spill onto food.

Lesson Outcomes

Students will:

1. Demonstrate the proper storage of fresh produce, meat, poultry and fish to prevent cross contamination.
2. Demonstrate the safe storage of kitchen chemicals

Essential Vocabulary

Chemical. A chemical is a substance that cannot be eaten or drunk. It is found in many cleaning supplies. This substance can NOT be stored near food because it will harm those who eat it. Chemicals must be stored far away from any food item or any item used to prepare food.

Contamination. When harmful microbes, chemicals, or foreign objects get into food, either naturally or by accident. Food that has been contaminated can make people sick and is not safe to eat.

Cross contamination. When harmful microbes are passed from one food or object to another food or object. The microbes can be passed by dripping food juices, by dirty utensils, cutting boards or equipment, and by food workers' hands. See *utensil.*

Perishable foods. Foods that spoil or "go bad" after a long period of time or if they are not stored properly. Perishable foods include meat products and fruits and vegetables. These foods also contain a lot of water, which is what bacteria like to grow in.

Ready-to-eat food. Foods that are not cooked or prepared any more before we eat them. Breads, cooked meats, sandwiches, soups and salads are ready-to-eat foods.

Review Chapter 2, *Proper Storage,* and Chapter 3, *Preparation,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Teaching Points

Opening Questions

1. What foods need to be stored in the refrigerator and why?

All perishable foods (meats, leftovers, most fresh fruits and vegetables and prepared foods) need to be refrigerated. Refrigeration slows the growth of bacteria. Your refrigerator temperature should be at or below 40°F.

2 .How can you prevent cross contamination when storing foods in the refigerator?

You can prevent cross contamination when foods are stored in the refrigerator by always storing meat, fish or poultry on shelves below ready-to-eat foods, such as fruits and vegetables that are to be eaten raw. This prevents the juices from the meat, fish or poultry that could contain harmful microbes from dripping onto the raw fruit and vegetables and contaminating them.

3. Where should dishwashing liquid and dishwasher detergent be stored?

All chemicals should be stored away from food and food storage areas. A good place to store dishwashing liquid and dishwasher detergent is beneath the kitchen sink.

Notes

- Date and label refrigerator items.
- Rotate items on a first-in, first-out basis.
- Food is refrigerated to slow the growth of bacteria so it is important to keep your refrigerator and freezer at the correct temperature.
- Check the temperature of your refrigerator and freezer with an appliance thermometer.
- The refrigerator should be at or below 40° F and the freezer should be at or below 0°F.
- Raw meat, poultry, and fish should be securely wrapped to maintain quality and to prevent meat juices from dripping onto other food.
- Raw foods should be kept separate from ready-to-eat foods.
- Keep any surface that comes in contact with food clean (hands, utensils, work surfaces). This can help to prevent bacteria from spreading.
- When in the grocery store proper food handling is equally important.
- Put raw meat, fish or poultry in clean bags and place in the grocery cart, away from fresh vegetables and other foods that are not going to be cooked. This will prevent the juices from dripping on the ready-to-eat foods.
- When the groceries are bagged, place like items together. For example, put only the raw meat, fish or poultry together in one bag. This will help to prevent the raw juices from dripping onto ready-to-eat foods such as fruits and vegetables, cereal, etc.
- Don't place non-food items such as cleaning supplies in the same bags with food items. Cleaning supplies could easily spill open and contaminate your food.

Store all chemicals

- Below or away from food and work surfaces.
- Label all chemicals. If chemicals are moved from the original container to a new one, be sure to label the new container.
- Make sure food is protected when cleaning the kitchen.

Once you get your food home, it is equally important to handle food safely. Be sure your hands are clean before you begin unpacking.

- Immediately refrigerate the groceries that belong in the freezer or refrigerator.
- Always store raw meat, fish or poultry on the bottom shelf or below ready–to-eat foods such as fresh vegetables, cold cuts, luncheon meats or leftover cooked foods to prevent the juices from dripping on the ready-to-eat foods. It is best to put them on a plate or tray.

Student Activities

A-18 Where Does It Go?
A-3 Reflection Worksheet

Student Activities

Unit 4 Fight Bac Principle: Separate

Lesson 1

Separate, Don't Cross Contaminate: Food Preparation

A-14 Pass the Apple
A-15 Travelin' Bugs
A-16 How Do Bacteria Get Around?
A-3 Reflection Worksheet

Lesson 2

Don't Cross Contaminate: Setting the Table and Serving

A-14 Pass the Apple
A-15 Travelin' Bugs
A-16 How Do Bacteria Get Around?
A-17 Set a "Food Safe" Table
A-3 Reflection Worksheet

Lesson 3

Don't Cross Contaminate: Storage

A-18 Where Does It Go
A-3 Reflection Worksheet

Student Activity A-14
Pass the Apple

Introduction

This activity is designed to help students understand how easily food can become contaminated when it comes in contact with people and other foods. This activity may be conducted one of two ways: Students may complete the activity individually and write their individual answers to the questions, or this can be conducted as a classroom activity with whole group discussion.

Supplies

- fresh apple (red)
- 1/2-inch yellow stickers
- Still pictures *Clean #9 and #10*
- A-14 Pass the Apple Worksheet

Directions

1. Give each student in the classroom a 1/2 inch round, yellow sticker.
2. The teacher begins by putting a sticker on the apple, then passes the apple around the room having each student put a sticker on the fruit.
3. Review the Worksheet. Have students respond to the questions individually by writing on the worksheet or have the class discuss the questions as a group and write the answers on the board.

Pass the Apple Worksheet

Write your answer to each question in the space provided.

What has happened to the fruit by the time it has gone around the room?

What do you think happens to fresh fruit and vegetables in the grocery store? Think about the number of people who might have touched the produce you whant to buy.

How should fresh produce be handled at home?

Student Activity A-15
Travelin' Bugs

Introduction

In this activity students will learn how microbes "travel" from one place to another. They can travel from our hands or bodies or food preparation surfaces to other places (food, a clean surface). The *Travelin' Bugs* lotion solution is used to simulate the bacteria that we all carry on our hands.

Students will see how bacteria can spread. They will see how our hands can spread bacteria to whatever we touch or the food we are preparing. Students will leard that there are steps which can be taken to prevent the spread of bacteria.

Supplies

- *Travelin' Bugs* Solution*
- Black light
- Dishes, pots, pans, utensiles, and other item we might touch when preparing, serving and cleaning up food
- Paper towels, etc. for clean up
- Still pictures *Clean #1– 5*
- A-15 Travelin' Bugs Worksheet

***To make *Travelin' Bugs* solution, you will need:**

- Large Plastic container
- Flouorescent paint (water-soluable)
- Hand lotion
- Spoon or paint stirrer

1. In a large plastic container, mix three parts water-soluble fluorescent paint to one part hand lotion.
2. Stir the solution well.

Note: If you don't want to make your own *Travelin' Bugs* solution, you can purchase it from Glo Germ. Kits containing Glo Germ™, a bottle of liquid or gel, a bottle of power, and an ultraviolet lamp are available through their website(www.glogerm.com). The price ranges from $50–$150.

Directions

1. Have students thoroughly cover their hands with the *Travelin' Bugs* solution and rub it in.
2. Ask students to role-play the following situation using any necessary utensils, appliances, dishes, pots, pans, etc.
   Act out the preparation and serving of a meal.
   Actual food will not be used, but make sure everything is done as if real food was being used.
   This will include the use of pots and pans, countertops, and/or setting the table, etc.
3. After the role-playing situations are finished, turn off the classroon incandescent lights.
4. Turn on the black light once the lights are off.
5. Be sure to (or be sure students) shine the light over all the surfaces/items that were touched in order to prepare and serve the "meal" while they had the *Travelin' Bugs* solution on their hands.
6. Turn lights back on and have students record what they observed.
7. Have the students wash their hands thoroughly with warm water and soap for 20 seconds and then dry their hands with a paper towel. Note: It will take at least three, 20-second hand washes to remove all the *Travelin' Bugs* solution.
8. With clean hands, have the students role-play the food preparation again.

9. When they are finished, shut the classroom lights off and shine the black light over the sur faces and items used in the role-playing again.
10. Have students record their second observations.
11. The Discussion Questions on the worksheet may be answered as either a class activity or by each student in written form on the worksheet.

Adapted from: *Community Service Learning Curriculum,* A program using the community service model to teach food safety education, 1994.

Travelin' Bugs Worksheet

Directions

1. Record your observations of the activity in the space below.
2. Answer the discussion questions in the spaces provided after each question.

Observations

Hands covered with Travelin' Bugs solution

_____

_____

_____

_____

_____

Clean hands

_____

_____

_____

_____

_____

Discussion Questions

1. When and how often should you wash your hands when preparing and serving food or when putting food away?

2. When preparing a meal of baked chicken, green beans, and tossed salad, how could harmful microbes (bacteria) from the raw chicken find their way into the tossed salad?

3. List the food safety practices that prevent cross contamination when preparing and serving food or when putting food away.

Student Activity A-16
How Do Bacteria Get Around

Introduction

In this activity students will see how quickly microbes can spread simply by contact with people or objects.

Supplies

- Flour
- Dishes, pots, pans, utensiles, and other items we might touch when preparing, serving and cleaning up food
- Paper towels, etc. for clean up
- Still pictures *Clean #1– 10*
- A-16 Travelin' Bugs Worksheet

Directions

1. Have half of the students thoroughly cover their hands with flour.
2. Have the students with the flour-covered hands shake hands with those students with "clean" hands.
3. Have the students with the "clean hands" now shake hands with other students.
4. Notice how the flour has spread from student to student's hands. The flour is like the bacteria that we can not see.

OR

1. Have students thoroughly cover their hands with the flour.
2. Ask the students to role-play the following situation using any necessary utensils, appliances, dishes, pots, pans, etc.:
   Act out the preparation of a meal.
   Actual food will not be used, but make sure everything is done as if real food was being used. This will include the use of pots, pans, and countertops and setting the table, etc.
3. Have the students observe what has happened to the flour that was originally just on their hands.
4. Once the activity is completed, have the students wash their hands thoroughly with warm water and soap for 20 seconds and then dry their hands with a paper towel. Note: It will most likely take two, 20-second hand washes to remove all the flour.
5. With clean hands, have the students role-play the food preparation again. Have students record their second observations.
6. Discussion questions may be answered by each student in writing on the worksheet or the teacher may choose to make this a class discussion activity.

How Do Bacteria Get Around Worksheet

Directions
1. Record your observations of the activity in the space below.
2. Answer the discussion questions in the spaces provided after each question.

Observations

Hands covered with flour

Clean hands

Discussion Questions

1. When and how often should you wash your hands when preparing and serving food or when putting food away?

2. When preparing a meal of baked chicken, green beans, and tossed salad, how could harmful microbes (bacteria) from the raw chicken find their way into the tossed salad?

3. List the food safety practices that prevent cross contamination when preparing and serving food or when putting food away.

Student Activity A-17
Set a 'Food Safe' Table

Supplies

- Glasses/cups
- Plates
- A full set(s) of utensils: knives, forks, spoons
- Napkins
- Serving dish with utensil
- Table or other surface to simulate dinner table—a placemat ot tablecloth might help with the visual effect!

Instructions

Have one student set the table. Have other students in the class observe how it is done.

Discussion Questions

Students may participate from their desks individually or work in small groups. If you choose to use small groups, have each report back and put answers on the board.

- Remind students that in "real life" everyone should wash their hands before setting the table.
- How does the student hold the plate, cups, and utensils when setting the table?
- Is there a right way and wrong way to set the table (when thinking about food safety—not how the table looks)?
- What would you do differently to make sure that it is safe to eat from the plate, cup and utensils?

Instructions

Have one student sit at the set table and have a second student bring over the serving dish and utensil and act as if they are serving food from the serving dish to the student seated at the table. Have other students in the class observe how it is done.

Discussion Questions

Students may participate from their desks individually or work in small groups. If you choose to use small groups, have each report back and put answers on the board.

- Remind students that in "real life" everyone should wash their hands before setting the table.
- How does the student hold the plate, cups, and utensils when setting the table?
- Is there a right way and wrong way to set the table (when thinking about food safety—not how the table looks)?
- What would you do differently to make sure that it is safe to eat from the plate, cup and utensils?

Remember, when setting the table and serving food, it is important to:

1. Wash your hands first.
2. Carry plates by the bottom or to the side of the rim (do not put fingers or hands on the eating surfaces).
3. Hold cups and glasses around the outside or from the bottom (do not stick fingers in cups—keep hands and fingers away from where a person's mouth will touch).
4. Carry utensils by the handles (do not touch the part of a utensil that will touch food or go into a person's mouth.
5. When serving from a serving dish, again, hold in such a way that food is not touched by your hands or fingers; hold the serving utensil by the handle. Try not to touch a per son's plate with the utensil—especially if they have already been eating from the plate.

Student Activity A-18
Where Does It Go?

Introduction

In this activity, the students will identify foods, separate and place them in the proper storage areas.

Supplies

- Sticky notes or index cards
- Markers
- 3 large poster boards
- Pictures of refrigerator, freezer, cabinet/shelves
- A-18 Where Does It Go? Worksheet

Directions

1. Paste pictures of refrigerator, freezer and cabinet/shelves on top of poster board.
2. Write the name of each food item on individual sticky notes or index cards.

Food Items	
Milk	Deli meat
Jam	Eggs
Sugar	Bulk rolled oats
Bulk rolled oats	Onions
Canned peaches	Lettuce
Ground beef	Chicken
Ice cream	Strawberries
Apples	Pasta
Cheese	Crackers
Vegetable oil	Canned tuna
Fish	Potatoes

3. Have the students place the grocery items on the poster board under one of the 3 headings. Note: If you have access to a kitchen you can have the students put the sticky notes directly on refrigerator, freezer or cabinet.

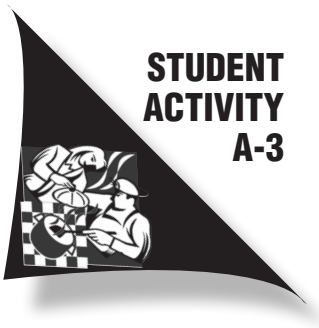
Where Does It Go?

Discussion Questions

1. What items did you put in the refrigerator? What would happen if you did not put them in the refrigerator?

2. What items did you put in the freezer? What would happen if you did not put them in the freezer?

Student Activity A-3
Reflection Worksheet



1. What have you learned from this lesson?

2. What changes do you plan to make in your food safety practices based on the results of this lesson?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

Separate Post Test

Student Name: _____

Directions

Below is a list of statements describing food safety issues. Please indicate whether you think the statement is Yes (Y) or No (N) by circling either Y or N. If you don't know (DK) the answer, please circle DK.

Unit 4	**Yes**	**No**	**Don't Know**
1. Cutting boards used to cut up raw meat fish or poultry should be cleaned before using with any other foods.	Y	N	DK
2. It's okay to store raw meat, fish or poultry wherever there is room in the refrigerator.	Y	N	DK
3. It is safe to place cooked hamburgers on the same unwashed plate that was used to bring the uncooked meat out to the grill.	Y	N	DK
4. When grocery shopping you can just put tomatoes and bananas in the same bag with raw chicken and hamburger.	Y	N	DK
5. It is not safe to use the same spoon to taste and then stir the food without washing the spoon.	Y	N	DK
6. Dishwashing detergent can be stored with dry food ingredients (i.e., flour and sugar as long as it is kept in the container it came in).	Y	N	DK
7. It's okay to store fresh produce anyplace in the refrigerator where there is room.	Y	N	DK

Separate Post Test Scoring Guide

Directions

For statements below, the correct answers have been boxed. A correct answer is given one (1) point; an incorrect answer or "don't know" is given zero (0) points.

Unit 4	Yes	No	Don't Know
1. Cutting boards used to cut up raw meat fish or poultry should be cleaned before using with any other foods.	[Y]	N	DK
2. It's okay to store raw meat, fish or poultry wherever there is room in the refrigerator.	Y	[N]	DK
3. It is safe to place cooked hamburgers on the same unwashed plate that was used to bring the uncooked meat out to the grill.	Y	[N]	DK
4. When grocery shopping you can just put tomatoes and bananas in the same bag with raw chicken and hamburger.	Y	[N]	DK
5. It is not safe to use the same spoon to taste and then stir the food without washing the spoon.	[Y]	N	DK
6. Dishwashing detergent can be stored with dry food ingredients (i.e., flour and sugar as long as it is kept in the container it came in).	Y	[N]	DK
7. It's okay to store fresh produce anyplace in the refrigerator where there is room.	Y	[N]	DK

Fight Bac Principle: Cook

Overview of Cook

Introduction

We know how important it is to wash our hands. We know that we must wash all the places and things that will touch our food. Now it is time to prepare the food. Handling and preparing food incorrectly can cause foodborne illness. In this unit you will learn the importance of cooking and keeping hot foods hot! Food experts agree that foods are properly cooked when they are heated for a long enough time and at a high enough temperature to kill harmful bacteria that cause foodborne illness (time/temperature).

Lesson Outcomes

Students will:
1. Understand what is meant by "temperature danger zone" by identifying the number range
2. Use a food thermometer to measure the internal temperatures of food
3. Understand how cooking reduces the risk of foodborne illness.

Essential Vocabulary

Cooking. Heating foods to a temperature high enough to eliminate harmful amounts of bacteria.

Food thermometer. A devise used to measure the temperature of foods in order to check if they are cooked to the right temperature before serving. Temperatures should be checked right after food is out of the oven in the center, thickest part of the food.

Pershihable foods. Foods that spoil or "go bad" after a long period of time or if they are not stored properly. Perishable foods include meat products and fruits and vegetables. These foods also contain a lot of water, which is what bacteria like to grow in.

Time-temperature abuse. Letting foods stay too long in the Temperature Danger Zone. It can also mean not cooking or reheation foods long enough to kill harmful microbes. See *Temperature Danger Zone.*

Temperature danger zone. Temperature range (40°F–140°F) within which most bacteria can grow and reproduce rapidly.

Learn More About it

- COOK (www.foodsafeschools.org)
- COOK (www.fightbac.org)
- Consumers/Guidelines for Proper Cooking (www.nsf.org)

Teaching Points

Opening Question

Can you tell if a food is cooked by touching it with your fingers? The only reliable way to tell if food is cooked to the proper temperature is to use a food thermometer.

Review Still Picture Photo File, *Cook # 1–2.*

Notes

- Cooking food safely is a matter of degrees!
- Color is not an indicator of whether food is safe to eat.
- Use a clean thermometer to determine if foods are properly cooked.
- Don't eat raw eggs, i.e. raw cookie dough, cake batter, etc.
- Fried or poached eggs should be cooked until the yolk is firm.
- Thermometers must be checked frequently to ensure the correct temperature of foods. For a dial thermometer, this can be done using the ice bath or hot water method (Student Activity A-20).
- The "danger zone" is the temperature range in which most bacteria grow (40°F to140°F).
- It is important to cook food to a safe internal temperature. These are different for different foods.
- Keep hot food hot! (140° F or above).
- Reheat cooked foods to at least 165° F. Certain foods, like soups, stews and gravies, can also be heated until they boil.

Review Chapter 4 *Cooking,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activities

A-19 What Temperature Am I?
A-20 Checking Food Temperatures: Time and Temperature

Fight Bac Principle: Cook

The Danger Zone

Introduction

The temperature "Danger Zone" is the temperature range between 40°F and 140°F where bacteria rapidly grow. For food to be safe it is important to keep cold food cold and hot food hot! By this we mean that every effort should be made to keep food that should be kept cold at or below 40°F and food that should be kept hot at or above 140°F. Of course there are times when food will be in the danger zone, but this should be minimized. Food that is at room temperature for two or more hours should be discarded.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Lesson Outcome

Students will understand what is meant by the Temperature Danger Zone.

Essential Vocabulary

Temperature Danger Zone. Temperature range (40°F–140°F) within which most bacteria can grow and reproduce rapidly.

Time/Temperature Abuse. Letting foods stay too long in the Temperature Danger Zone. It can also mean not cooking or reheating foods long enough to kill harmful microbes. See *Temperature Danger Zone.*

Learn More About it

- Fact Sheets/Safe Food Handling; *How Temperatures Affect Food* (**www.fsis.gov)**
- A to Z Guide/*The A to Z Comprehensive List of Terms: Danger Zone* (**www.cfsan.fda.org)**

Teaching Points

Opening Questions

1. **What is the lower limit temperature of the Temperature Danger Zone?**
   The lower limit of the Temperature Danger Zone is 40° F.
2. **What is the higher limit temperature of the Temperature Danger Zone?**
   The higher limit of the Temperature Danger Zone is 140° F.

Notes

- Proper food temperature has an impact on food safety.
- Bacteria are killed when foods are cooked for a long enough time at a high enough temperature.
- Many harmful bacteria grow at room temperature. The range for room temperature is 72–74° F.
- The temperature range where most bacteria grow best is called the *Temperature Danger Zone*.
- The *Temperature Danger Zone* is 40° F–140° F.
- Hot foods should be kept hot at 165° F or above.
- Cold foods should be kept cold at 40° F or below.
- Food should pass through the Danger Zone within two hours.
- Reheat cooked foods to at least 165° F. Certain foods, like soups, stews, and gravies, should be heated until they boil.

Review Chapter 3 *Cooking,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activity

A-19 What Temperature Am I?
A-3 Reflection Worksheet

Fight Bac Principle: Cook

The Tale of the Food Thermometer

Introduction

The best way to keep foods safe, especially meat, fish, and poultry, is to cook them. In order to be safe, different foods must be cooked to different temperatures to ensure that harmful bacteria are killed. Scientists have done lots of experiments to determine to what degree food must be cooked to kill bacteria. The only sure way to know that food is cooked to the proper temperature is to use a food thermometer.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Lesson Outcome

Students will be able to use a food thermometer to measure the internal temperature of food.

Essential Vocabulary

Food Thmometer. A device used to measure the temperature of foods in order to check if they are cooked to the right temperature before serving. Temperatures should be checked right after food is out of the oven in the center, thickest part of the food.

Calibrate. To check a thermometer to be sure it is working correctly, and resetting it if it does not show the correct temperature. Different ways to calibrate a thermometer are the boiling point method and the ice point method. See *boiling point method*.

Teaching Points

Opening Question

How can you tell if food is cooked to the proper temperature?

The only reliable way to tell if food is cooked to the proper temperature is to use a food thermometer.

Learn More About it

- Food Termometers (**www.fsis.usda.gov/Fact_Sheets/Kitchen_Thermometers/index.asp)**

Notes

- Limit the time food is in the Temperature Danger Zone (40° F–140° F).
- Bacteria grow very slowly at low temperatures, multiply rapidly in mid-range temperatures and are killed at high temperatures.
- Research shows that neither color nor texture are reliable indicators.
- A food thermometer is the only reliable way to ensure food safety.
- When using a digital food thermometer, the stem is inserted into the thickest part of the food at least three inches. If taking the temperature of a casserole or other dish such as lasagna, the food thermometer should be inserted into the middle of the dish if using a dial food thermometer, the stem should be inserted into the food up to the dimple on the stem.
- A digital termometer is recommended as it provides a greater level of accuracy. The digital thermometer may be checked for accuracy by using either the ice bath or boiling water method. (Note: As the boiling point method requires the use of water brought to a boil (212°F) this method is not recommended for safety reasons in the classroom. The directions for only the ice bath method are included in this unit.
- Cook foods to the Recommended Internal Temperature. A chart listing final internal cooking temperatures is located at the end of this lesson.

Review Still Picture Photo File, *Cook # 1–2.*

Review Chapter 3 *Cooking,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activities

A-20 Checking Food Temperatures: Time and Temperature
A-3 Reflections Worksheet

Recommended Internal Temperatures*

Product	Degrees Fahrenheit
Eggs & Egg Dishes	
Eggs	160°
Egg dishes	160°
Ground Meat and Poultry Mixtures	
Turkey, chicken (including patties)	165°
Veal, beef, lamb, pork (including patties)	160°
Fresh Beef	
Medium rare	145°
Medium	160°
Well done	170°
Fresh Lamb	
Medium rare	145°
Medium	160°
Well done	170°
Fresh Pork	
Medium	160°
Well done	170°
Poultry	
Chicken, whole	165°
Turkey, whole	165°
Poultry breasts, roasts	165°
Poultry thighs, wings	165°
Stuffing (cooked alone or in bird)	165°
Duck and goose	165°
Ham	
Fresh (raw)	160°
Pre-cooked (to reheat)	140°

*These temperatures are recommended for consumer cooking.
They are not intended for processing, institutional, or foodservice preparation.

Student Activities

Unit 5 Fight Bac Principle: Cook

Lesson 5-1 Overview of Cook

A-19 What Temperature Am I?
A-20 Checking Hot Temperatures: Time and Temperature
A-3 Reflection Worksheet

Lesson 5-2 The Danger Zone

A-19 What Temperature Am I?
A-3 Reflection Worksheet

Lesson 5-3 The Tale of the Food Thermometer

A-20 Checking Hot Temperatures: Time and Temperature
A-3 Reflection Worksheet

Student Activity A-19
What Temperature Am I?

Introduction

During this activity, students will learn the correct final cooking temperatures and the importance of cooking foods to the correct temperature as a means of reducing the risk of foodborne illness.

Supplies

- Large thermometer dials made of plain heavy cardboard
- Red construction paper for the dial
- A-19 *What Temperature Am I?* Worksheet
- Still pictures, *Cook #1–2*

Directions

Use heavy cardboard to make several large round thermometer dials with red, moveable arrow moveable pointer. Set them up as stations in the classroom. Ask the following questions at each of the stations. Have students record their answers on A-19 What Temperature Am I? Worksheet. Discuss the reasons for their answers.

Note: Correct Answers are bolded

- Station 1 Move the red pointer on the thermometer to the temperature that represents the lower limit of the Temperature Danger Zone **(40° F)**.
- Station 2 Move the red pointer on the thermometer to the temperature that represents the upper limit of the Temperature Danger Zone **(140° F)**.
- Station 3 Move the red pointer on the thermometer to the temperature that you must cook hamburgers to **(160° F)**.
- Station 4 Move the red pointer on the thermometer to the temperature that your food kept in the refrigerator must be at **(40° F)**.
- Station 5 Move the red pointer on the thermometer to the temperature that you must cook chicken to **(165° F)**.
- Station 6 Move the red pointer on the thermometer to the temperature that you must cook pork to **(160° F)**.
- Station 7 Move the red pointer on the thermometer to the temperature that you must cook fish to **(145° F)**.
- Station 8 Move the red pointer on the thermometer to the temperature that you should always reheat leftover food to **(165° F)**.
- Station 9 Move the red pointer on the thermometer to the temperature that identifies body temperature.**(98.6° F)**.
- Station 10 Move the red pointer on the thermometer to the temperature that you should keep your refrigerator **(40° F)**.

- Station 11 Move the red pointer on the thermometer to the temperature that water boils (**212° F**).
- Station 12 Move the red pointer on the thermometer to the temperature that water freezes (**32° F**).

Student Activity A-19
Tale of the Food Thermometer

What Temperature Am I?

Directions: Record your answers for each station.

Station 1

Station 2

Station 3

Station 4

Station 5

Station 6

Station 7

Station 8

Station 9

Station 10

Station 11

Station 12

Student Activity A-20 Checking Food Temperatures: Time and Temperature

Introduction

In this activity students will learn that only with complete and thorough cooking of potentially hazardous foods will most harmful bacteria be destroyed. Using a thermometer to measure the food's final internal temperature is the only way to ensure safety and to determine the desired "doneness" of most foods. **Doneness** refers to the desired texture, appearance, and juiciness of the food. Unlike the temperatures required for food safety, aspects of a food's doneness are personal preference. For example, a hamburger patty may turn brown all the way through before it has reached the temperature at which harmful bacteria may be destroyed. To be safe, a product must be cooked to an internal temperature high enough to destroy any harmful bacteria that may have been in the food.

Most harmful (pathogenic) bacteria are destroyed between 140°F and 165°F. However, for best quality, meat and poultry require various temperatures for "doneness."

More information on the final cooking temperatures may be found on the *Fight BAC* website: www.befoodsafe.org and the *Be Food Safe* pamphlet in Appendix 3.

More information on the various types of food termometers may be found at www.fsis.usda.gov/Fact_Sheets/Kitchen_Thermometers/index.asp.

The instructions for calibrating a thermometer are included in this activity. However, current research shows that more accurate readings may be obtained by using a digital rather than dial thermometer. Digital thermometers can be purchased for $7–15 at your local restaurant supply house.

Note: For accuracy, it is recommended that a digital food thermometer be used to measure the internal temperature of foods. They usually cost under $20. Since they can not be calibrated, this exercise may be used to check their accuracy. If the thermometer is not accurate, which is rare, you should be in touch with the manufacturer and purchase a new one. A chart listing final internal cooking temperatures for most foods is located in Unit 5, Lesson 3.

Note: This student activity must be done in a full kitchen. If your classroom does not have a fully equipped kitchen, we recommend you work with your school's Family and Consumer Sciences or Culinary Arts teacher. However, this Student Activity with the same objectives may be done in a regular classroom setting, where food would not be prepared. You would simply review the written recipes with the students paying particular attention to any cooking and cooling temperatures in the recipe using resources listed.The student s could record their temperatures on worksheet A-20 Checking Food Temperatures.

Supplies

- Container of crushed ice
- Digital food thermometer
- Ingredients and recipes for one hot meat dish, one hot soup, one cold salad, and one hot casserole or egg dish (copies of selected recipes are included in this Student Activity)
- A-20 Checking Food Temperatures: Time and Temperature Worksheet

Directions

1. Check the accuracy of the digital food thermometer using the Freezing Point Method.
2. Select a recipe for one of the three food dishes (hot meat, hot soup, and hot casserole) you will be preparing.
3. Review chart of internal cooking temperatures found in Lesson 3, The Tale of the Food Thermometer. Fill in the blanks (cooking temperature) found in the recipes on Worksheet A-20 Checking Food Temperature: Time and Temperature.
4. When the students have completed the recipe, they should take the internal temperature of the prepared food with the food thermometer.
5. Record the temperature on the Food Temperature Record Worksheet included in this activity.
6. Prepare the remaining recipes and take the internal temperature when you have completed preparing each food item.
7. Answer the Discussion Questions as a class and record on the board, or have each student complete their own.

Student Activity A-20
Time and Temperature

Directions for Checking the Accuracy of a Digital Thermometer by the Freezing Point Method

1. Fill a clear glass bowl with crushed ice.
2. Insert the digital thermometer at least half way up the stem into the ice.
3. The dial should read zero.

Note: Any inacuracies can be taken into consideration when using the food thermometer or the food thermometer can be replaced. For example, the temperature of the crushed ice is 32°F. If the food thermometer reads 34°F in crushed ice, it is reading two degrees too high. Therefore two degrees must be subtracted from the temperature displayed when taking a reading in food to find out the true temperature. In another example, for safety, ground beef patties must reach 160°F. If the thermometer is reading two degrees too high, two degrees would be added to the desired temperature, meaning hamburger patties must be cooked to 162°F.

Adapted from: *Community Service Learning Curriculum, A Program Using the Community Service Model to Teach Youth Food Safety.*

Chicken Noodle Soup

Ingredients:
4 cups Chicken Broth (low salt pre-made)
Generous dash ground black pepper
1 medium carrot, sliced (about 1/2 cup)
1 stalk celery, sliced (about 1/2 cup)
1 medium onion, chopped (about 1/2 cup)
1/2 cup uncooked medium egg noodles
1 cup cubed cooked chicken

Preparation:
1. Combine broth, celery, carrots, onions and pepper.
2. Bring to a boil. Reduce heat and cover. Simmer for 20 minutes
3. Add noodles and chicken. Return to simmer. Cover. Simmer for 10 minutes or until noodles are tender.

Heat to: _____

Honey Lemon Chicken

Ingredients:
1/3 cup honey
1/4 cup lemon juice
1/3 cup flour
1/2 teaspoon pepper
1 teaspoon salt
6 chicken breasts

Preparation:
1. Preheat oven to 375° F
2. Combine honey, lemon, pepper and salt in a bowl. Set aside.
3. Remove skin from chicken breasts. Discard. Place chicken breasts into 13 x 9 pan.
4. Bake at 375° F for 20 minutes
5. Drain fat and discard.
6. Pour honey-lemon mixture over chicken.
7. Bake until golden brown. Approximately 15 minutes at 350° F.

Heat to: _____ **or higher**

Lasagna

Ingredients:
8 ounces lean ground beef
1 cup chopped onion
2 cloves garlic, minced
1 14½ oz. can low-sodium tomatoes, undrained and cut up
1 6 oz. can tomato paste
1½ teaspoons dried basil
1½ teaspoons dried oregano
¼ teaspoon salt
¼ teaspoon pepper
9 packaged dried lasagna noodles

1 12 oz. carton low-fat cottage cheese
1½ cups shredded reduced-fat mozzarella cheese (6 ounces)
¼ cup grated Parmesan cheese
1 egg
2 tablespoons fresh parsley
¼ teaspoon pepper

Preparation:

1. Brown ground beef. Drain. Add onions and garlic. Cook for 5 minutes.
   Heat to: _____
2. Stir in undrained tomatoes, tomato paste, basil, oregano and salt.
3. Bring to boil; reduce heat. Simmer, covered for 15 minutes; stir occasionally.
4. Cook lasagna noodles according to package directions. Drain; rinse with cold water. Drain well.
5. Combine cottage cheese, 1 cup mozzarella cheese, Parmesan cheese, egg, parsley and pepper.
6. Layer one-third of the cooked noodles in a 13 x 9 baking dish. Spread with half of the filling.
7. Top with one-third of sauce. Repeat layers. Top with remaining noodles and sauce. Sprinkle with remaining 1/2 cup mozzarella cheese.
8. Tightly cover pans with foil.
9. Bake at 350°F for 1 hour.

Heat to: _____ or higher

Food Temperature Data Sheet

A-20 Checking Food Temperatures: Time and Temperature Record Worksheet

Food	Internal Temperature	Internal Temperature USDA Recommended

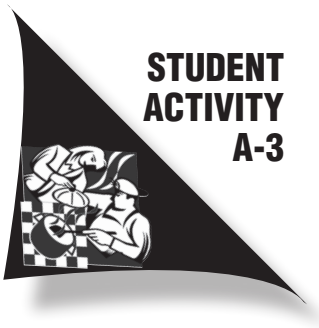
Discussion Questions

1. If the food does not reach the required final cooking temperature, what should you do and why?

2. When preparing a cold food, what steps can you take to ensure that the final food product is at 40°F?

3. How would you take the temperature of a breast of chicken?

Student Activity A-3
Reflection Worksheet



1. What have you learned from this lesson?

2. What changes do you plan to make in your food safety practices based on the results of this lesson?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

Cook Post Test

Student Name: _____

Directions

Below is a list of statements describing food safety issues. Please indicate whether you think the statement is YES (Y) or NO (N) by circling either Y or N. If you don't know (DK) the answer, please circle DK.

Unit 5	Yes	No	Don't Know
1. Always rotate food cooked in a microwave to avoid "cold spots" in the food.	Y	N	DK
2. Leftovers should be reheated to at least 140°F.	Y	N	DK
3. When cooking eggs, it's okay if the yoke is runny.	Y	N	DK
4. It is safe to taste raw cookie dough that contains raw eggs.	Y	N	DK
5. It is safe to use raw eggs in recipes that will not be cooked.	Y	N	DK
6. You can tell that baked chicken is thoroughly cooked by the color of the juices.	Y	N	DK
7. Using a food thermometer is the best way of knowing that food is thoroughly cooked.	Y	N	DK
8. You should always bring soup to a boil when it is reheated.	Y	N	DK

Cook Post Test Scoring Guide

Directions

For statements below, the correct answers have been boxed. A correct answer is given one (1) point; an incorrect answer or "don't know" is given zero (0) points.

Unit 5		Yes	No	Don't Know
1.	Always rotate food cooked in a microwave to avoid "cold spots" in the food.	[Y]	N	DK
2.	Leftovers should be reheated to at least 140°F.	Y	[N]	DK
3.	When cooking eggs, it's okay if the yoke is runny.	Y	[N]	DK
4.	It is safe to taste raw cookie dough that contains raw eggs.	Y	[N]	DK
5.	It is safe to use raw eggs in recipes that will not be cooked.	Y	[N]	DK
6.	You can tell that baked chicken is thoroughly cooked by the color of the juices.	Y	[N]	DK
7.	Using a food thermometer is the best way of knowing that food is thoroughly cooked.	[Y]	N	DK
8.	You should always bring soup to a boil when it is reheated.	[Y]	N	DK

Fight Bac Principle: Chill

Chill Overview

Introduction

A refrigerator is one of the most important pieces of equipment in the kitchen for keeping foods safe. Refrigeration slows bacterial growth. As we have learned, bacteria are everywhere and bacteria grow most rapidly in the "danger zone." Remember, the "danger zone" is the temperature between 40°F and 140°F where some bacteria/microbes double in number in as little as 20 minutes. It is important to verify refrigerator temperatures frequently. Refrigerator temperature should be maintained at 40°F or below in order to keep food safe. Freezers should be kept at 0°F or below. The only way to ensure proper refrigerator and freezer temperatures is to use refrigerator and freezer appliance thermometers.

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Lesson Outcomes

Students will:

1. Learn the basic food safety principles that apply to cold food preparation, and storage of leftver hot and cold foods as a means of reducing the risk of foodborne illness.
2. Learn to apply basic food safety principles when packing a lunch as a means of reducing the risk of foodborne illness.

Essential Vocabulary

Chill. To cool down or store foods in a cool temperature at or below 40°F in order to slow the growth of bacteria and keep foods out of the "Danger Zone."

Defrosting/Thawing. A way of "unfreezing" frozen food. Frozen food should be defrosted in the microwave, under cold running water, or in the refrigerator.

Risky Foods. Often called Potentially Hazardous Food (PHF). Risky foods can support the growth of harmful microbes that can cause foodborne illness. These foods usually have high protein and moisture content and are low in acid. (Note: In the current FDA Food Code PHF are referred to as TCS-Foods Time/Temperature Control for Safety.)

Perishable Foods. Foods that spoil or "go bad" after a long period of time or if they are not stored properly. Perishable foods include meat products and fruits and vegetables. These foods also contain a lot of water, which is what bacteria like to grow in.

Learn More About it

- CHILL
  www.fightbac.org
- Chill Facts
  www.foodsafety.gov

Teaching Points

Opening Question

Is it okay to eat pizza that has been left on the counter overnight? Why or why not? It is not okay to eat pizza that has been left on the counter overnight. Food that sits out on the kitchen counter all night has been in the "Temperature Danger Zone" for far too long to be safe.

Review Still Picture Photo File, *Chill #1-4.*

Notes

- Refrigeration will slow down the growth of harmful microbes.
- Chilling foods properly is one way to reduce risk of foodborne illness.
- All perishable foods should be refrigerated within 2 hours.
- Maintain refrigerator temperature at 40°F or below.
- Leave room in the refrigerator for the cool air to circulate. Don't overfill.
- Separate leftovers into shallow pans for faster cooling.
- Use stainless steel containers to store food when possible. Metal helps cool food faster.

Review Chapter 6 *Refrigerate,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activities

A-21 Yeast balloon blow-up
A-22 Time and Temperature, Refrigerator Temperature Log
A-23 Time and Temperature, Cool Down
A-3 Reflection Worksheet

Fight Bac Principle: Chill

Keeping Food Cold

Introduction

Cold foods need to be kept cold at all times. This includes thawing, preparing, serving, and storing leftovers. Thawing or defrosting frozen foods needs to be done in a controlled way to prevent foodborne illness. When preparing and serving cold food keep it cold. Store food in the refrigerator or in a cooler packed with ice or ice pacs.

Lesson Outcome

Students will learn the basic food safety principles that apply to food preparation and storage of leftover hot and cold foods as a means of reducing the risk of foodborne illness.

Essential Vocabulary

Defrosting/Thawing. A way of "unfreezing" frozen food. Frozen food should be defrosted in the microwave, under cold running water, or in the refrigerator.

Teaching Points

Opening Question

What temperature should cold foods be kept at to keep them safe?
Cold foods should be kept at or below 40° F to be safe. Your refrigerator temperature should be 40° F or below.

Notes

- Generally, bacteria do not grow well at temperatures that are too cold and bacteria are killed at temperatures that are hot.
- The rule is to keep "cold foods cold and hot foods hot."
- Harmful microbel like to grow at warm temperatures.
- Refrigerator temperatures should be at 40°F or below. At this cold temperature, most harmful microbes either do not grow or grow slowly.
- Freezer temperature should be at or below 0°F.
- Foods that have been cooked or foods that should stay cold should not be in the danger zone for more than two hours.
- Refrigerate leftovers as quickly as possible.
- Separate large portions of leftovers into smaller containers for quicker cooling.
- Label and date all leftovers.

Defrosting Food

Defrosting or thawing frozen food to be eaten or cooked must be done safely. There are four acceptable ways to defrost frozen food. Frozen food should never be defrosted on the counter or at room temperature! The four acceptable methods are:

- In the refrigerator
- In the microwave
- Under cool running water
- Cook from the frozen state

Student Activities

A-21 Yeast balloon blow-up
A-2 Time and Temperature: Refrigerator Temperature Log
A-3 Reflection Worksheet

Note: Throughout the curriculum, the authors will use the word "microbes" when talking about any of the microorganisms that cause foodborne illness, and will use the word "bacteria" when referring to that specific type of microorganism.

Note: If there is not a refrigerator in your classroom, make arrangements with the Family and Consumer Science teacher to have your students monitor one in the food lab.

Learn More About It

- EMO Forms/Documents Scroll to Environmental Health Protection Guidelines: Thaw Food Properly. **www.emd.saccounty.net**

Review Chapter 6, *Refrigerate,* from the video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activities

Unit 6 Fight Bac Principle: Chill

Lesson 6-1 Overview of Chill

A-21 Yeast Balloon Blow-Up
A-22 Time and Temperature: Refrigerator Temperature Log
A-23 Time and Temperature: Cool Down
A-3 Reflection Worksheet

Lesson 6-2 Keeping Food Cold

A-21 Yeast Balloon Blow-Up
A-22 Time and Temperature: Refrigerator Temperature Log
A-3 Reflection Worksheet

Student Activity A-21
Yeast Balloon Blow-Up

Introduction

During this activity students will identify the factors that affect and explain the relationships among personal habits, lifestyle choices, and human health.

Yeast is a good microorganism and can show how bacteria can multiply. It has growth properties that are similar to bacteria. The yeast solution placed in the cold water bath simulates what happens to bacteria when it is refrigerated. Bacteria grow considerably slower in the refrigerator.

The yeast solution in the warm water bath simulates what happens to bacteria when left out, particularly in a warm place. This yeast will thrive within the Temperature Danger Zone and will grow. The danger zone is 40° F to 140° F. As the yeast grows, it bubbles, creates gas and causes the balloon to inflate.

Bacteria can thrive on a certain quantity of sugar; the sugar solution makes the growth more rapid.

This activity may be done in small groups or as a demonstration.

Supplies (for each group of students)

- 2 balloons
- 3 500 ml beakers or medium sized clear glass bowls
- 2 small clear flasks or plastic bottles with small openings
- Food thermometer to measure the temperature of the water
- Room temperature water (70° F)
- Warm water (109°F to 120° F)
- Ice water (below 40° F)
- 1/4 cup sugar
- 1 package of dry yeast (2¼ tsp)
- A-21 Yeast Balloon Blow-Up Worksheet

Discussion Points

Take advantage of this opportunity to talk about "good" microbes. Good bacteria help to make yogurt, pickles, and bread. Explain the term "perishable" food, like dairy products, meat, or vegetables that will spoil rapidly if not refrigerated.

The water in a shallow container will cool more quickly than in a large or deep container. It is important to store leftovers in shallow containers in the refrigerator for quickest cooling. What do you think will happen? Can chilling food help stop the growth of bacteria? Yes? No? Why?

Directions

1. Fill the two balloons with air to stretch them out; then deflate. Label the beakers: "Mixing Beaker," "Warm Water Bath," and "Ice Water Bath."
2. Fill with 500 ml beaker (about two cups) of room temperature (70° F) water. Use a food thermometer to measure the temperature of the water.
3. Dissolve the sugar in the room temperature water. Add a package of dry yeast (2¼ tsp) and stir gently until it dissolves.
4. Pour half the solution into Flask 1 and the other half into Flask 2. Carefully stretch the balloon opening to fit over the openings of the flasks. Place one flask in each of the other beakers.
5. Put warm water (about 110° F to 120° F) into the Warm Water Bath beaker. Add just enough to cover the yeast mixture in the flask.
6. Put ice water (below 40° F) into the Ice Water Bath beaker. Again, add just enough to cover the yeast mixture in the flask.
7. Observe and record what happens after 5 minutes, after 30 minutes, after 1 hour.

Adapted from:

FDA Center for Food Safety and Applied Nutrition **www.foodsafety.gov**.

Canadian Partnership for Consumer Food Safety Education **www.canfightbac.org**

Yeast Balloon Blow-Up Worksheet

What do you think will happen?

Can chilling food help stop the growth of bacteria? Yes ____ No ____ Why?

_____

_____

Directions

1. Fill the two balloons with air to stretch them out, then deflate. Label the beakers, "Mixing Beaker," Warm Water Bath," and "Ice Water Bath."
2. Fill with 500ml (about two cups) of room temperature (70°F) water. Use a food themometer to measure the temperature of the water.
3. Dissolve the sugar in the room temperature water. Add a package of dry yeast (2-1/4 tsp) and stir gently until it dissolves.
4. Pour half the solution into Flask 1 and the other half into Flask 2. Carefully stretch the balloon opening to fit over the openings of the flasks. Place one flask in each of the other beakers.
5. Put warm water (about 110°F to 120°F) into the Warm Water Bath beaker. Add just enough to cover the yeast mixture in the flask.
6. Put ice water (below 40°F) into the Ice Water Bath beaker. Again, add just enough water to cover the yeast mixture in the flask.
7. Observe and record what happenes after 5 minutes, after 30 minutes, after 1 hour.

Record Your Results

What happened after?

5 minutes:

_____

_____

30 minutes:

_____

_____

1 hour:

_____

_____

Discussion Questions

1. If the yeast in the warm water was harmful bacteria instead of good yeast what could you say about what happens to harmful bacteria when it is warm?

2. If the yeast in the ice water was harmful bacteria instead of good yeast what could you say about what happenes to harmful bacteria when it is cold?

3. What would happen if you put a sample of the yeast/sugar solution in the refrigerator?

Student Activity A-22 Time and Temperature: Refrigerator Log

Introduction

During this activity students will learn the importance of making sure that the refrigerator is actually keeping the food inside cold, at 40° F or below, and out of the Temperature Danger-zone (4°–140° F). At cool temperatures, most harmful bacteria grow slowly. Keeping food cold is one way to reduce the risk of foodborne illness and maintain the quality of food. The only way to make certain that your refrigerator is operating at the temperature it should (40° F or below) is to take the temperature inside at regular time periods.

Supplies

- Refrigerator appliance thermometer(s)
- Refrigerator
- A-22 Time and Temperature: Refrigerator Temperature Log Worksheet

Directions

1. Have students place a refrigerator thermometer in the rear of the refrigerator. Make sure the thermometer is in the same spot in the refrigerator each time you take a reading. Note: You may want to use two thermometers and place one on the top refrigerator shelf and one in the bottom drawer or shelf.
2. Have students check and record the temperature reading at the beginning of the first class in the morning and at the end of the last class each school day. Record the temperature on the A-22 Refrigerator Temperature Log Worksheet.
3. You could also provide students with refrigerator thermometers and a copy of the worksheet and ask them to check and record their home refrigerator temperature. Temperature recordings should be done in the morning before school and again after dinner.
4. Have students keep the log for at least two weeks.
5. Have students answer the Discussion Questions.
6. Review the logs and discuss why temperatures may have varied during the two weeks.

Adapted from: Community Service Learning Curriculum, A Program Using the Community Service Model to Teach Youth Food Safety, 1994.

Refrigerator Temperature Log

Week of ___________________________

	Monday	Tuesday	Wednesday	Thursday	Friday
a.m. (___ °F) / Initials					
p.m. (___ °F) / Initials					

Week of ___________________________

	Monday	Tuesday	Wednesday	Thursday	Friday
a.m. (___ °F) / Initials					
p.m. (___ °F) / Initials					

Week of ___________________________

	Monday	Tuesday	Wednesday	Thursday	Friday
a.m. (___ °F) / Initials					
p.m. (___ °F) / Initials					

Week of ___________________________

	Monday	Tuesday	Wednesday	Thursday	Friday
a.m. (___ °F) / Initials					
p.m. (___ °F) / Initials					

Student Activity A-23
Time and Temperature: Cool Down

Introduction

In this activity students will learn how long it takes for a dish of hot oatmeal to cool down depending on the quantity of food being cooled. It is important that large quantities of hot food get divided into smaller portions when cooling. Larger quantities of food take longer to cool down, even in the refriferator, and may cause foods to be in the Temperature Danger Zone (40°–140°F) too long, therefore making the food unsafe to eat. It is important to remember that failure to cool food rapidly is one of the leading causes of foodborne illness. To reduce the risk of illness, keep food out of the Temperature Danger Zone as much as possible. This activity may be done in small groups or as a classroom demonstration.

Supplies

- 6 packets (about 1 0z. each) of instant oatmeal
- 4 cup liquid measuring cup
- Water
- 2 Microwave safe bowls, laneled Bowl #1 and Bowl #2
- Spoon
- 2 small shallow storage containers
- Food thermometers
- Microwave
- Refrigerator
- A-20 Time and Temperature: Cool Down Worksheet

Directions

Remind students to wash their hands for at least 20 seconds with warm water and soap.

1. Pour 3 packets of oatmeal in Bowls 1 and 2.
2. Pour 1-1/2 cups of water into each bowl of oatmeal (1/2 cup per packet) and thoroughly mix together.
3. After adding the water, follow the microwave heating instructions on the oatmeal packets or box.
4. Heat the bowls of oatmeal one bowl at a time.
5. When Bowl 1 is thoroughly heated, remove from microwave and stir briefly. Note: The bowl will be very hot, use a pot holder to remove the bowl from the microwave.
6. Check the temperature of the oatmeal with a food thermometer in the center of Bowl #1 (it should be 140°F or higher, out of the Temperature Danger Zone). Record the time and temperature of the oatmeal on the A-23 Time and Temperature: Cool Down Worksheet.
7. Leave Bowl 1 in a safe place on the counter.
8. Check the temperature of Bowl 1 every 20 minutes. Record temperatures for each reading.
9. When Bowl 2 is thoroughly heated, remove it from the microwave and stir briefly. Note: The bowl will be very hot, use a pot holder to remove the bowl from the microwave.
10. Use a food thermometer to check the temperature of Bowl 2 to make sure it is above 140°F.
11. Divide equal amounts of the oatmeal in Bowl 2 into the two small shallow storage containers.
12. Record time and temperature for one of the shallow storage containers and put the storage container in to refrigerator.
13. Check and record temperature of the refrigerated storage container every 20 minutes until it reaches 40°F.
14. At this time record the time and the temperature of the oatmeal sitting on the counter in Bowl 1.
15. Once all time and temperatures have been recorded throw away the oatmeal. DO NOT EAT IT!

Time and Temperature: Cool Down Worksheet

On Counter Bowl #1	
Time	**Temp**

In the Refrigerator Shallow Container	
Time	**Temp**

Discussion Questions

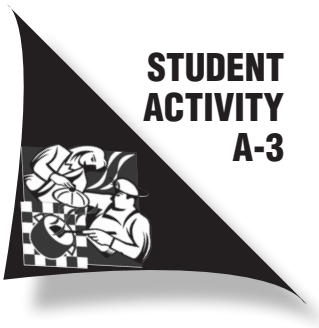
Answer the questions in the space provided below each question.

1. How long did it take each container to cool down to 40° F?

2. What was the temperature of the water in each container after one hour of cooling?

3. Which method is the most efficient way to cool down water? Why?

Student Activity A-3
Reflection Worksheet



1. What have you learned from this lesson?

2. What changes do you plan to make in your food safety practices based on the results of this lesson?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

Chill Post Test

Student Name: _____

Directions

Below is a list of statements describing food safety issues. Please indicate whether you think the statement is Yes (Y) or No (N) by circling either Y or N. If you don't know (DK) the answer, please circle DK.

Unit 6		**Yes**	**No**	**Don't Know**
1.	Leftovers after a meal can be safely left on the counter for 4 hours.	Y	N	DK
2.	The safest place to defrost frozen chicken is on the kitchen counter.	Y	N	DK
3.	The temperature of a refrigerator should be 40 F or lower.	Y	N	DK
4.	It is safe to leave hot cooked food on the counter to completely cool at room temper ature before putting in the refrigerator.	Y	N	DK
5.	It's okay to defrost food in the microwave and cook it immediately.	Y	N	DK
6.	If a green bean casserole is left on the kitchen counter overnight, it's safe to eat if it is properly reheated.	Y	N	DK
7.	A very large pot of chicken soup will cool very quickly in the refrigerator and be safe to eat.	Y	N	DK

Chill Post Test Scoring Guide

Directions

For statements below the correct answers have been boxed. A correct answer is given one (1) point; an incorrect answer or "don't know" is given zero (0) points.

Unit 6		Yes	No	Don't Know
1.	Leftovers after a meal can be safely left on the counter for 4 hours.	Y	[N]	DK
2.	The safest place to defrost frozen chicken is on the kitchen counter.	Y	[N]	DK
3.	The temperature of a refrigerator should be 40° F or lower.	[Y]	N	DK
4.	It is safe to leave hot cooked food on the counter to completely cool at room temperature before putting in the refrigerator.	Y	[N]	DK
5.	It's okay to defrost food in the microwave and cook it immediately.	[Y]	N	DK
6.	If a green bean casserole is left on the kitchen counter overnight, it's safe to eat if it is properly reheated.	Y	[N]	DK
7.	A very large pot of chicken soup will cool very quickly in the refrigerator and be safe to eat.	Y	[N]	DK

Putting It All Together

Introduction

Now that we have learned about the 4 C's (clean, separate (don't cross-contaminate), cook, chill) of food safety it's time to "put it all together"! Remember: Keep it clean, keep it separate, keep it hot and/or keep it cold! It is essential to remember these four food safety principles whenever you work with food.

Lesson Outcome

Students will learn to apply basic food safety principles when packing a lunch as a means of reducing the risk of foodborne illness.

Essential Vocabulary

4 C's of Food Safety:
Fight BAC–CLEAN
Fight BAC–SEPARATE (DON'T CROSS CONTAMINATE)
Fight BAC–COOK
Fight BAC–CLEAN

Temperature Danger Zone. Temperature range (40°F–149°F) within which most bacteria can grow and reproduce rapidly.

Teaching Points

Opening Question

If you made a turkey and cheese sandwich at home this morning and bought it with you to school for lunch today how are you going to keep it cold until lunchtime?

There are a couple ways you could keep your sandwich cold until lunchtime. The easiest way would be to include an ice pack with your lunch. Freeze the ice pack the night before and put it into your lunch bag with your sandwich. If you didn't have an ice pack you could freeze a juice box or water bottle the night before and they could act as an ice pack. For a disposable ice pack, freeze about 1 cup of water in a zip lock plastic bag over night.

Notes

- Review the four **Fight Bac** principles of food safety using the *Be Food Safe* brochure found in Appendix 3.
- Clean
- Separate
- Cook
- Chill
- Food left in the temperature danger zone for too long could cause harmful bacteria to grow
- Foods that come out of the refrigerator need to be kept cold

Student Activities

A-24 Packing a Safe Lunch
A-25 Lunch Test
A-26 Putting It All Together: Appreciation Luncheon
A-27 Putting It All Together: Appreciation Luncheon
A-3 Reflection Worksheet

Learn More About It

- Safe Food Handling/Clean Separate, Cook, Clean
- Safe Food Handling/Safety Fall: BAC! To School

www.fightbac.org

- Fact Sheets
  Scrolldown to Keeping "Bag" Lunches Safe.

www.fsis.usda.gov

Review the entire video. Discuss what went wrong and how and why "wrong" behaviors were corrected.

Student Activites

Unit 7 Putting It All Together

Lesson 1 Putting It All Together

A-24 Packing a Safe Lunch
A-25 Lunch Test
A-26 Putting It All Together: Appreciation Luncheon
A-27 Putting It All Together: Appreciation Luncheon
A-3 Reflection Worksheet

Student Activity A-24
Packing a Safe Lunch

Introduction

During this activity, students will learn to apply basic food safety principles when packing a lunch as a means of reducing the risk of foodborne illness.

Supplies

- A-24 Packing a Safe Lunch Worksheet
- Still Picture file *Clean #1–10, Cook #1–2* and *Chill #1–4.*

Directions

1. Review with students the basic principles of packing a safe lunch.
2. Review the directions for completing A-24 Pack a Safe Lunch Worksheet.
3. Discuss answers as a class.

Adapted from: *Food Safety House, Food Safety Curriculum for Grades 1–6.*

Packing a Safe Lunch Worksheet

Name: _____

Directions

Below is a list of foods. Some foods need to be kept hot, some need to be kept cold, and some foods can be kept at room temperature (not hot or cold). Put each food in the correct list so it will be safe to eat.

Foods List

Apples (whole)
Banana
Beef stew
Carrot sticks
Cheese slices
Chicken soup
Cookies
Crackers
Ham sandwich
Milk
Orange slices
Macaroni and cheese
Pretzels
Pudding
Salad
Spaghetti
Tuna sandwich
Yogurt

Foods that are safe when kept cold	Foods that are safe when kept hot	Foods that do not have to be kept hot or cold

Student Activity A-25
The Lunch Test

Introduction

During this activity, students will learn the importance of keeping cold food cold so that they can reduce the risk of foodborne illness.

Supplies

- Sandwiches made with some type of deli meat like bologna, turkey or ham, cheese and lettuce with mayonnaise and mustard
- Fruit
- Cookies
- Container of yogurt
- Plain plastic bags
- Insulated lunch container
- "Ice pack"
- A-25 The Lunch Test Worksheet

Directions

1. Have students pack two lunches at the beginning of the school day each with the same cold food items, i.e. yogurt, bologna sandwich).
2. Put one lunch in a plain paper bag and the other in an insulated lunch container with a cold pack.
3. Leave the two lunches on a counter in the classroom.
4. Students take turns using a food thermometer to take the internal temperature of the food items at one-hour intervals throughout the day and recording the temperatures on A-25 The Lunch Test Worksheet. Note: Review with students the correct way to take the internal temperature of foods. Also remind them to wash the food thermometer with warm water and soap and rinse in hot water after each use.
5. Have students make a bar graph of the results to show the difference between the two lunches plotting the temperatures taken at each interval.
6. Discuss why it is important to "pack your lunch" the right way.
7. Discard the contents of both lunches at the end of the school day.

The Lunch Test Worksheet

Lunch in the Paper Bag Temperature Record

Directions
Use one sheet for each food item in the lunch.

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

The Lunch Test Worksheet

Lunch in the Insulated Lunch Container Temperature Record

Directions
Use one sheet for each food item in the lunch.

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

Food ______________________

Time	Temp
8:00 a.m.	
9:00 a.m.	
10:00 a.m.	
11:00 a.m.	
12 noon	
1:00 p.m.	
2:00 p.m.	
3:00 p.m.	

The Lunch Test Worksheet

Discussion Question

In the space below list other ways you could use to keep your lunch cold.

Student Activity A-26
Putting It All Together

Teacher Appreciation Luncheon

Introduction

In the past four units, we have explored the basic concepts of preventing foodborne illness using Fight BAC! Four Simple Steps to Food Safety. Now it is time to have the students put theory into practice. This unit covers all the steps necessary to plan, shop for, prepare, serve and clean-up from a lunch event at school. This activity can be done either by using the written scenario or by the students actually engaging in all the activities in a foods lab/apartment setting to prepare, serve and cleanup from a meal.

Supplies

- Recipes for Planned Menu
- Ingredients for Planned Menu
- Scenario (If not actually preparing the meal)
- Food Safety Smart Video
- A-26 Planning Worksheet
- A-26 Job Assignment Worksheet

Directions

1. Share with students the following scenario or the real-life plan for the meal.

   Scenario

   During the next few days, we are going to have the opportunity to apply all the food safety principles we have learned in the past few weeks. We are going to prepare a celebration meal for our friends and families. It is going to be our job to plan the menu, shop for the food, store it, prepare and serve it, and clean-up after the event. We have been given a budget of $_____.

2. After the menu has been selected, discuss with students how we might accomplish this event and be "Food Safety Smart." Show and discuss the entire "Food Safety Smart Video."

3. Have students select recipes.

4. Have students review recipes and discuss which steps in the recipe are important to the food safety of the recipe.

5. Students can then write in the food safety steps needed at each point in the recipe directions where food safety steps are important to the safety of the final recipe. Have students think especially about foos safety principles that apply to the cooking and chilling steps in the recipe.

6. Review the jobs to be done and who will do them. Also, discuss specific food safety principles elated to each job.
   a. Planning (we've done as a group)
   b. Making the list and shopping
   c. Putting food away
   d. Preparing the food
   e. Serving
   f. Cleaning up

7. Have students complete the Planning Worksheet,

Appreciation Luncheon Planning Worksheet

Sample Menu

Baked Chicken
Fresh Green Beans
Tossed Salad with Italian Dressing
Fresh Fruit Cup and Cookies
Milk and Juice

Questions to be answered as we plan the event

1. How many people will be attending?

2. How long to we have to prepare the food?

3. What kitchen facilities do we have to use?

4. Do any people have food allergies that we need to consider?

5. What else might we need to know to plan this event?

Plan the menu with food safety and cost in mind.

Appreciation Luncheon Planning Worksheet

Recipes

Baked Chicken

Ingredients
4 chicken breasts
"coating mixture" of 1 cup flour, 1 tsp Onion powder
1/4 tsp pepper and 1 tsp paprika
Large Plastic bag
9x13 baking dish

Directions
1. Preheat oven 375° F.
2. Combine "coating mixture" ingredients in a large plastic bag.
3. Shake.
4. Use tongs or other cooking utensil to place chicken pieces in the bag.
5. Shake until all the chicken pieces are coated.
6. Use tongs or other cooking utensil to remove the coated chicken pieces and place in a 9 x 13 baking dish.
6. Bake 20–30 minutes until internal temperature reads 165° F.

Serves: 4

Green Beans

Ingredients
1 pound fresh green beans, washed,trimmed, cut into 1-inch pieces.

Directions
To Steam
1. Place steamer basket in 1/2 inch of water in sauce pan.
2. Place beans in basket.
3. Cover tightly and heat to boiling; reduce heat. Steam 10–12 minutes.

To Boil
1. Place beans in saucepan in 1 inch of water.
2. Heat to boiling; reduce heat.
3. Boil uncovered 5 minutes.
4. Cover and boil 5–10 minutes longer.
5. Drain.

Serves: 4

Appreciation Luncheon Planning Worksheet

Recipes

Tossed Salad

Ingredients
1 head Romaine or Iceberg lettuce, washed and torn into small pieces
3 medium ripe tomatoes, sliced into sections
1 small cucumber, sliced
Italian dressing

Directions
Place all ingredients in a clean bowl; toss lightly with Italian dressing.

Serves: 4

Fruit Salad

Ingredients
2 bananas, peeled, sliced
2 apples, cored, cut into bite-sized pieces
3 oranges, peeled, sectioned, cut into bite size pieces
1 small bunch red grapes, stems removed, sliced in half
2 tablespoons orange juice

Directions
1. After slicing bananas and apples, place in a bowl; sprinkle with orange juice to prevent browning. Set aside.
2. Just before serving, toss all ingredients together.

Serves: 4

Job Assignment Worksheet

Job Assignment	Student(s) Name	Food Safety Principle(s) Important to Job			
		Clean	Separate	Cook	Chill
Planning					
Shopping					
Putting food away					
Preparing food					
Serving					
Cleaning up					

Student Activity A-27
Summary of Food Safety Survey

Introduction

During Unit 1, Lesson 1, Introducing Students to Food Safety, students asked friends, family and/or fellow students a series of food safety questions. The purpose of this end-of-curriculum activity is to reflect on the results and use those results to answer Reflection Questions.

Supplies

- Completed Food Safety Surveys
- A-27 Summary of Food Safety Survey

Directions

1. Have the students tabulate the results of the survey. Use blank (unanswered) copies of the survey to record result totals.
2. Students may then "analyze" or think about the results. They may make generalizations according to age of the respondents. They may also develop charts, graphs or other visuals to compare and contrast their findings. Also, they may share the visuals with the class and/or other students, teachers and family members.

Based on their experiences in conducting and reviewing the results of the food safety survey, students should answer the questions on the A-27 Summary of Food Safety Survey Worksheet. This activity could be done as either a group activity or by the students individually.

Summary of Food Safety Survey Worksheet

Instructions

Based on your experience in conducting and reviewing the results of the food safety survey, answer the questions in the space provided after each question.

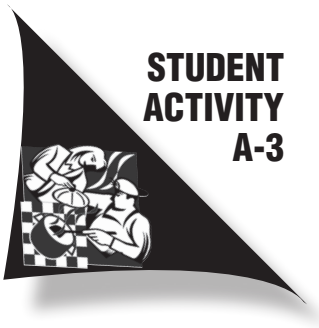
1. The person in my family (class, school) who rated highest in the survey was:

2. I think the main reason for this was:

3. I was surprised to find out that:

4. What I learned the most about was:

Student Activity A-3
Reflection Worksheet

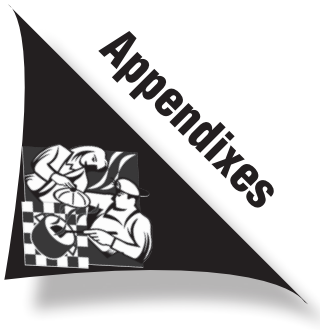


1. What have you learned from this activity?

2. What changes do you plan to make in your food safety practices based on the results of this activity?

3. What did you like best about the student activity(s) in this lesson?

4. What did you like least about the student activity(s) in this lesson?

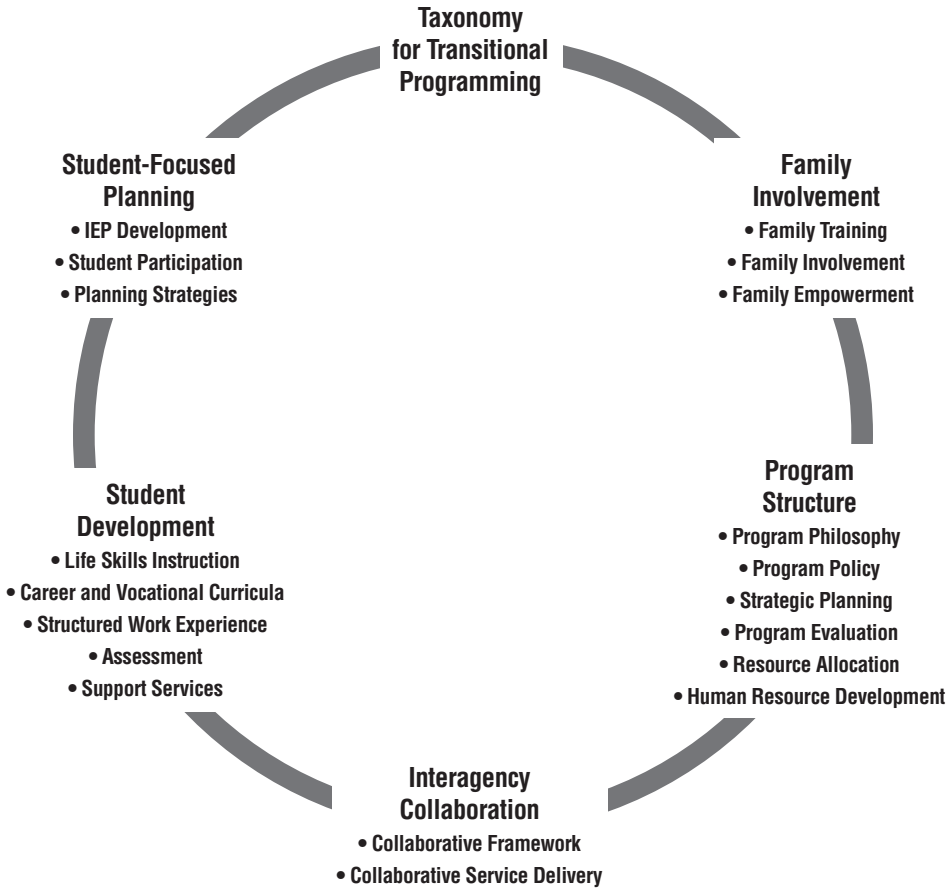

Appendixes

Appendixes

1. Kohler's Taxonomy for Transitional Programming
2. Be Food Safe Brochure (English and Spanish
3. Food Safety Smart Photo File
4. Essential Vocabulary—Glossary of Food Safety Terms
5. Interactive Power Point Activity
6. Food Safety Practices Assessment
7. Food Service Application of Curriculum
8. General Food Safety Guideleines
9. References

Appendix 1

Kohler's Taxonomy for Transitional Programming



Appendix 2

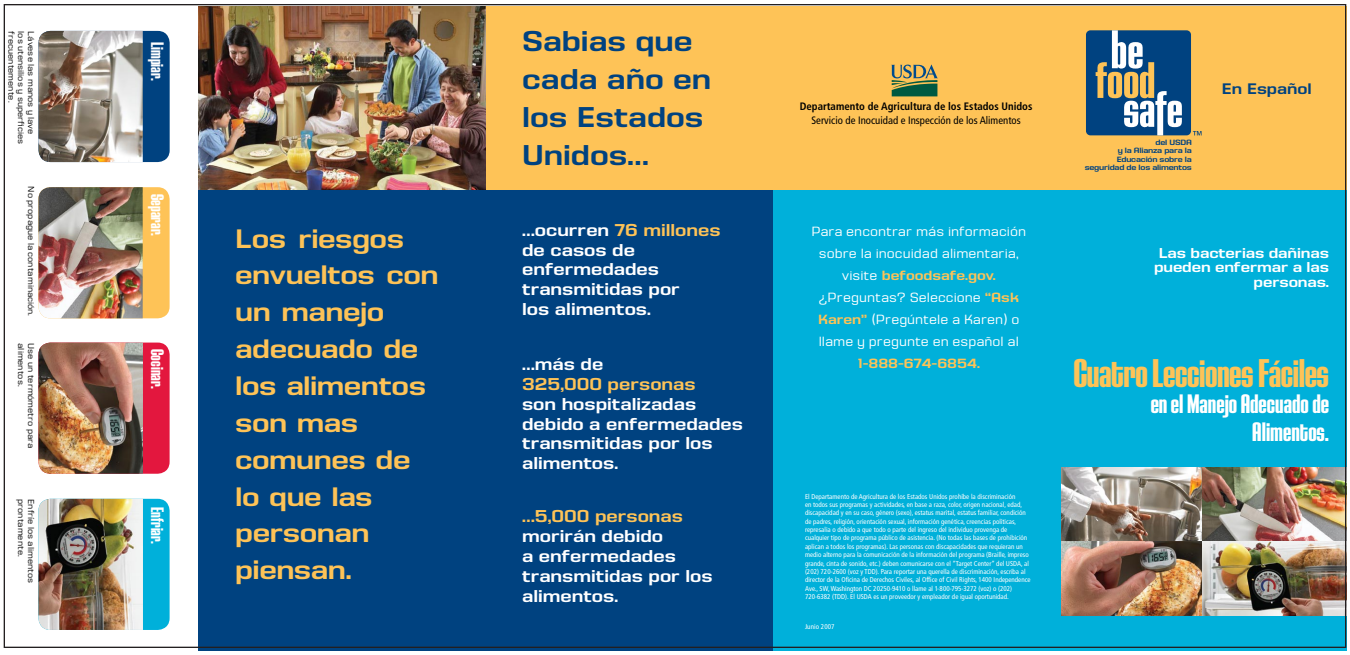
Be Food Safe Brochure, English

www.fsis.usda.gov/PDF/BFS_Brochure.pdf

Appendix 2

Be Food Safe Brochure, Spanish

www.fsis.usda.gov/PDF/BFS_Brochure.pdf



Appendix 3

Food Safety Smart Photo File and Addendum

Unit 3. Fight BAC! Principle: Clean

- Clean #1, Clean sink, soap, paper towels
- Clean #2, Washing hands with soap
- Clean #3a, Rinsing hands
- Clean #3b, Drying Hands with paper towel
- Clean #4, Ray in dirty clothes
- Clean #5, Ray in clean clothes
- Clean #6, Washing cutting board
- Clean #7a, Wiping crumbs off the counter
- Clean #7b, Cleaning the counter
- Clean #8a, Scraping off food
- Clean #8b, Washing the dishes
- Clean #8c, Air dry the dishes
- Clean #9, Washing grapes
- Clean #10, Covering a sneeze

Unit 5. Fight BAC! Principle: Cook

- Cook #1, Setting oven temperature
- Cook #2, Checking final cooking temperature with food thermometer

Unit 6. Fight BAC! Principle: Chill

- Chill #1, Appliance thermometer in refrigerator
- Chill #2, Covering food before placing in refrigerator
- Chill #3, Placing food in a small shallow container
- Chill #4, Placement of leftovers in the refrigerator

Appendix 4

Essential Vocabulary
Glossary of Food Safety Terms

Allergen	Causes an allergic. See *allergic reaction.*
Allergic reaction	Getting sick with itching, sneezing, a hand time breathing or even passing out. Certain foods, like shellfish, eggs, or nuts can cause allergic reactions.
Bacteria	Tiny living things that are not animals or plants. Unlike parasites and viruses, bacteria grow in food. You can only see them through a microscope, and you cannot smell or taste them. Some bacteria are helpful, other bacteria can cause sickness. The harmful bacteria that cause sickness are often called pathogens or harmful microbes See *microbes; microorganisms*.
Bare-hand contact	To pick up or touch food with bare hands—without gloves on or without using utensils. See *utensil*.
Boiling point method	A way to check a thermometer to be sure it is working correctly. You dip the thermometer into boiling water and look to see if it shows 212°F (100°C). If it does not, you must reset the thermometer to show the correct temperature for boiling water, 212°F.
Calibrate	To check a thermometer to be sure it is working correctly, and resetting if it does not show the correct temperature. Different ways to calibrate a thermometer are the boiling method and the ice point method. See *boiling point method; ice point method.*
CDC	Centers for Disease Control and Prevention. CDC is the government agency that works to prevent and control diseases (sickness) in the U.S. CDC also keeps track of how many people get sick from foods and why.
Chemical	A substance that cannot be eaten or drunk. It is found in many cleaning supplies. The substance cannot be stored near food because it will harm those who eat it. Chemicals must be stored far away from any food item or any item used to prepare food.
Chill	To cool down or store foods in a cool temperature (at or below 40°F) in order to slow the growth of bacteria and keep foods out of the "Danger Zone."
Clean	To remove all dirt and bits of foodthat you can see from dishes, countertops, cutting boards, and other food contact surfaces. Cleaning is not the same as sanitizing. See *food contact surface; sanitize.*
Clothing	(Apparel) The clothes worn in the kitchen should always be clean to prevent any contamination of food items.
Contamination	When harmful microbes, chemicals, or foreign objects get into food, either naturally or by accident. Food that has been contaminated can make people sick and is not safe to eat.
Cooking	Heating foods to a temperature high enough to eliminate harmful amounts of bacteria.

Essential Vocabulary
Glossary of Food Safety Terms

Cross contamination	When harmful microbes are passed from one food or object to another food or object. The microbes can be passed by dripping food juices, by dirty utensils, cutting boards or equipment, and by food workers' hands. See *utensil*.
Defrosting/Thawing	A way of "unfreezing" frozen food. Frozen food should be defrosted in the microwave, under cold running water, or in the refrigerator.
FDA Food Code	A set of guidelines for preparing foods safely, that is written by the United States Food and Drug Administration (FDA). Invidual states use the FDA Food Code as a model when they make rules about food safety for food service establishments. See *Food Safety*.
Food allergy	When people have an allergic reaction when they eat a certain food. Some foods that cause allergic reactions in some people are: milk, eggs, wheat products, soy, peanuts, tree nuts, fish and shellfish. See *allergic reaction*.
Food contact surface	Any part of equipment, utensils, dishes, cutting boards, containters or wrappings that directly touches food. See *utensil*.
Food safety	Doing everything that must be done to keep food safe and healthy to eat.
Food thermometer	A device used to measure the temperature of foods in order to check if they are cooked to the right temperature before serving. Temperatures should be checked right after food is out of the oven in the center, thickest part of the food.
Foodborne	Carried in food.
Foodborne illness	Sickness caused by eating contaminated food. Some people call it "food poisoning." See *contamination*.
Foodborne illness outbreak	When two or more people get the same illness after eating the same food from the same place.
Foodborne intoxication	A sickness caused by eating food that contains a toxin (poison).
Food preparation area	Places in the kitchen where food is made ready to eat. Includes tables, countertops, sinks, stoves, and ovens.
Food service establishments	Any place that prepares serves or sells food to people; includes stores, restaurants, bars, schools, day care centers, hospitals, sports arenas, army military bases, prisons, businesses and other places.
Fungi	A group of microorganisms that includes molds and yeasts. See *microbes/microorganisms; molds; yeasts.*
Hand sanitizer	Soap or liquid rubbed onto the hands to kill harmful germs on the hands. The use of hand sanitizers does NOT take the place of hand washing.
Hand washing (technique)	Hands should be washed with warm water and soap for at least 20 seconds while rubbing hands together. Wash hands in order to prevent spreading of microbes from the hands to food. Hands should then be rinsed and then dried with a disposable towel. Always wash hands between tasks, after touching a pet, going to the bathroom, etc.

Essential Vocabulary
Glossary of Food Safety Terms

Hot holding	Keeping hot foods hot, and out of the Danger Zone.This means keeping hot foods at a temperature of 140ºF or higher. See *Temperature Danger Zone.*
Ice Point Method	A way to check a thermometer to be sure it works correctly. You dip the thermometer into crushed ice and look to see if it shows 32ºF (0ºC). If it does not, you must reset the thermometer to show the correct temperature for ice, 32ºF.
Internal temperature	The temperature deep inside the food. Not the temperature on the surface of the food or in the oven.
Microbes/Microorganisms	These very tiny living things can only be seen through a microscope. They include bacteria, viruses, and fungi. Some may be harmful to people and others are helpful. Harmful microbes that can make people sick are called pathogens or harmful bacteria. See *bacteria; virus; parasite; fungi.*
Parasite	A microorganism that lives in some animals, fish or plants. The parasite needs the person or animal, fish or plant in order to live. People can get sick if they eat a live parasite in food, which will then grow in them.
Pasteurized	Foods like milk or cider, that have been heated to a high temperature for a short period of time to destroy bacteria that cause sickness. See *bacteria.*
Pathogen	Microorganisms that cause sickness. Includes harmful bacteria, viruses, and parasites. See *microbes/microorganisms; bacteria; virus; parasite.*
Perishable foods	Foods that spoil or "go bad" after a long period of time or if they are not stored properly. Perishable foods include meat products and fruits and vegetables. These foods also contain a lot of water, which is what bacteria like to grow in.
Personal hygiene	Keeping yourself clean by having good health habits—like bathing, washing hair, wearing clean clothes and washing hands often.
Pests	Insects or animals like mice. Pests can carry harmful microbes and bring them into food.
Potable water	Water that is safe to drink.
Potentially hazardous foods	Foods that harmful microbes can grow in easily, if we don't handle the foods correctly. In the current FDA Model Food Code, these foods are now called Time/Temperature Controlled for Safety Foods (TCS- Foods).
Ready-to-eat food	Foods that are not cooked or prepared any more before we can eat them. Breads, cooked meats, sandwiches, soups and salads are ready-to-eat foods.
Risky foods	Also called potentially hazardous foods (PHF). Risky foods can support the growth of harmful microbes that can cause foodborne illness. These foods usually have high protein and moisture content and are low in acid. (Note in the current FDA Food Code PHF are referred to as TCS Foods–Time/temperature control for safety.)

Essential Vocabulary
Glossary of Food Safety Terms

Sanitize	Using heat or chemicals to reduce the number of microorganisms on a surface to a safe level. Sanitizing is done to food contact surfaces that have already been cleaned. See *microbes/microorganisms; food contact surface; clean.*
Separate	Using different items between different tasks when preparing foods. For example, using one cutting board and knife when cut ting fruits or vegetables and a different cutting board and knife when cutting meat, poultry or fish. Separating helps to prevent cross contamination.
Single-use gloves	Plastic gloves that you should throw away after you use them.
Spoilage	When food starts to look, taste or smell rotten. Food spoilage is caused by yeasts, molds and some kinds of bacteria. See *yeasts; molds; bacteria.*
Temperature Danger Zone	Temperatures range (40º F–140º F) within which most bacteria can grow and reproduce rapidly.
Temperature	The amount of hotness or coldness of something (like food or drinks), as measured by a thermometer.
Thawing	Frozen food becoming unfrozen before preparing it; this is what happens to the food when you defrost it.
Time-temperature abuse	Letting foods stay too long in the Temperature Danger Zone. It can also mean not cooking or reheating foods long enough to kill harmful microbes. See *Temperature Danger Zone.*
USDA	United States Department of Agriculture: A government agency that works to make sure that meat, poultry and egg products are safe.
Utensil	A tool used to pick up, stir or serve food. Examples are a spoon, fork or tongs.
Virus	The smallest microbe that can make people sick. A virus needs a person or an animal in which to grow. Viruses are usually spread through unwashed hands. See mibrobes/microorganisms.
Yeasts	Microorganisms that need sugar and wetness to live. Some yeasts spoil foods. Other yeasts are helpful and used to make wines and other foods.

Essential Vocabulary
Glossary of Food Safety Terms

Foodborne Pathogens

Bacillus cereus	A bacteria that can cause a foodborne intoxication. It may be found in cooked starchy foods like rice, pasta and potatoes that are not cooled correctly, or not hot-held correctly after cooking. See *bacteria; hot-holding.*
Clostridium botulinum	A bacteria that can cause a foodborne intoxication that can kill you. It may be found in canned foods that were not canned the right way or were damaged. It can also be found in some kinds of cooked foods, like baked potatoes or grilled onions that were not held at safe temperatures. See *bacteria.*
E. coli (Escherichia coli)	A bacteria that can cause a foodborne toxin-mediated infection. It may be found in foods like ground beef that have been contami nated by animal wastes or sewage. It can also be found in fruit juices that were not pasteurized. Correct cooking or pasteurization can kill these bacteria, so that they do not cause illness in the person eating the food. See *bacteria; contamination; Pasteurized.*
Hepatitis A	A virus that can cause a foodborne infection. Hepatitis A can get into food when food handlers who are sick with this virus do not wash their hands after using the toilet. The virus can also be found in water contaminated by sewage, and in shellfish taken from contaminated water. See *virus.*
Listeria	A bacteria that can cause a foodborne infection. It may be found in dairy products that were not pasteurized, and in some contaminated processed meats like hot dogs or bologna that are refrigerated for several weeks. See *bacteria; Pasteurized*.
Salmonella	A bacteria that can cause a foodborne infection. It is often found in poultry products and may be found in shell eggs. The bacterium is also often found in the stools of infected food employees. It can cause illness when these foods are served raw or are undercooked. See *bacteria*.
Staphylococcus aureus	A bacteria that can cause a foodborne illness when cooked foods are not cooled the right way or are held at unsafe temperatures. The bacteria are also found in human cuts and sores See *bacteria; foodborne intoxication.*

Source: *Taking a Closer Look: Food Safety Word List.* UMass Extension. Revised 2/06.

Appendix 5

Interactive Power Point Activity

Introduction

The food safety concepts presented in this Interactive Power Point Presentation support all of the units in the curriculum. The questions could be used as an introduction to a specific lesson or as a review at the end of a lesson. It might also be used as a comprehensive post test for the curriculum. The correct answer is bolded.

The location in the curriculum and video of the food safety principle addressed in the question is listed below each question.

1. You can tell when food is unsafe to eat by using:
   a. your sight
   b. your smell
   c. your taste
   d. none of your senses

Unit 2, Lesson 1 (does not specifically mention 'taste')

2. Bacteria and viruses that can get into food and get you sick can come from:
   a. only animals
   b. only people
   c. only equipment
   d. everywhere

Unit 2, Lesson 1
Unit 3, Lesson 1
VIDEO 5:38

3. Harmful bacteria can spread throughout the kitchen by:
   a. only dirty hands
   b. only dirty utensils (knives, forks, spoons)
   c. only dirty countertops
   d. only uncooked food
   e. all of the above

Unit 2, Lesson 1
Unit 3, Lesson 1
Unit 3,Lesson 4
VIDEO 5:38

4. For bacteria to grow quickly, they need:
   a. food, water and very hot temperatures
   b. food, no water and warm temperatures
   c. food, water, warm temperature and time
   d. water, warm temperature, time and no food

Unit 2, Lesson 1 (written as "food (nutrients), warmth (temperature), moisture (water), and time")

5. The "Temperature Danger Zone" is the:
   a. the temperature range where bacteria are killed
   b. the temperature range where bacteria like to grow
   c. the temperature range where bacteria cannot live
   d. the temperature range that food should be cooked

Unit 2, Lesson 1 (written "grow best")

Interactive Power Point Activity

6. The temperature range for the "Temperature Danger Zone" is:
   a. 70° F – 140° F
   b. 40° F – 140° F
   c. 72° F – 165° F
   d. 100° F – 140° F

Unit 2, Lesson 1
Unit 5, Lesson 2

7. Microbes/Microorganisms can grow rapidly in the:
   a. Temperature Danger Zone
   b. refrigerator
   c. hot oven
   d. freezer

Unit 5, Lesson 2

8. Your hands should be washed using:
   a. warm water and soap, rubbing your hands together for 10 seconds
   b. warm water only
   c. warm water and soap, rubbing your hands together for 20 seconds
   d. cold water only

Unit 3, Lesson 1 (includes outline of steps)
VIDEO 4:30

9. Hands should always be washed before preparing food. You should always wash your hands before preparing food.
   a. Yes
   b. No

Unit 3, Lesson 1
VIDEO 4:21

10. You should clean pots and pans, utensils and dishes that are used to prepare food by:
    a. washing with cold water and soap and rinsing in cold water
    b. washing with hot water and soap and rinsing in hot water
    c. washing with cold water and wiping with a dishcloth or towel
    d. wiping with a clean dishcloth or towel

VIDEO 16:00

11. The most important reason to thoroughly cook chicken or beef is to:
    a. make sure it is warm enough for you to eat
    b. destroy harmful microbes/microorganisms that could make you sick
    c. make sure it is the right color
    d. make sure it tastes good

Unit 5, Lesson 1
Unit 5, Lesson 2
VIDEO– 9:45

12. You know that a food is cooked correctly:
    a. when it reaches the correct internal temperature using a food thermometer
    b. after it has been cooked for a certain amount of time using a timer
    c. after it has been cooked at a certain oven temperature
    d. after you tasting e it

Interactive Power Point Activity

Unit 5, Lesson 3
VIDEO 9:08, 9:45

13. The temperature of your refrigerator should be no higher than:
    a. 0° F
    b. 40° F
    c. 50° F
    d. 60° F

Unit 4, Lesson 3
VIDEO 14:07

14. Storing foods in the refrigerator is important to food safety because cold temperatures will
    a. kill most bacteria
    b. will make food taste better
    c. will prevent or slow the growth of bacteria
    d. will make the food look better

Unit 2, Lesson 1
Unit 4, Lesson 3
Unit 6, Lesson 1
VIDEO 13:45

15. After cooking chicken or meat, where should you place a food thermometer to check the temperature to see if it is thoroughly cooked?
    a. All the way through the food to the other side
    b. At the edge of the food
    c. In the middle of the food
    d. In the thickest part of the food

Unit 5, Lesson 3
VIDEO 9:27

16. After cooking a casserole a dish of lasagna, where should you place the a food thermometer to check the temperature to see if it is thoroughly cooked?
    a. All the way through the food to the other side
    b. At the edge of the food
    c. In the middle of the food
    d. In the thickest part of the food

Unit 5, Lesson 3

17. If cooked chicken is left out on the table overnight, the best thing to do so you won't get sick is to:
    a. reheat it so it is very hot
    b. put it in the refrigerator right away
    c. throw it out
    d. put it in the freezer

Unit 5, Lesson 2
Unit 6, Lesson 1 (opening question-pizza example)

18. It is okay to put a large amount of hot cooked soup in one big container in the refrigerator so all the soup can be in one place and take up less room.
    a. Yes
    b. No

Interactive Power Point Activity

Unit 6, Lesson 1
Unit 6, Lesson 2
VIDEO 13:52

19. It is safe to thaw frozen meat, chicken or fish:
    a. only in the refrigerator
    b. only under cold running water
    c. only in the microwave oven
    d. all of the above

Unit 6, Lesson 2

20. If juices from uncooked (raw) chicken or beef drip onto fresh fruit while stored in the refrigerator, the fruit should be that will be served for a dessert, you should:
    a. rinsed with cool l water and store in refrigerator:
    b. wiped it off with a clean paper towel and served
    c. throw the fruit out
    d. the fruit should be served right away

VIDEO 2:43

21. Cutting boards should be thoroughly cleaned after cutting raw chicken and before cutting vegetables that you to be used in will be using in a salad.
    a. Yes
    b. No

Unit 4, Lesson 1
VIDEO 4:58, 7:00

22. When you go shopping, put raw meat and/or chicken in your shopping cart:
    a. any place there is room
    b. with all other foods that need to be kept cold
    c. away from all ready to eat foods in your cart or in a separate bag
    d. with your fruits and vegetables

Unit 4, Lesson 3

23. Practicing good personal hygiene will help keep food safe when you prepare a meal.
    a. Yes
    b. No

Unit 2, Lesson 1 (written "poor hygiene…")
Unit 3, Lesson 3 (covers wearing clean clothing and aprons)
VIDEO 4:11 (covers wearing clean clothing)

24. Keeping food safe is simple if you do the following:
    a. only cooking thoroughly
    b. only chill quickly
    c. only practice good hygiene and cleaning
    d. only separating uncooked, raw food from food that is meat, seafood or poultry from ready-to-eat foods
    e. all of the above

Appendix 6

Food Safety Practices Assessment

Evaluating the effectiveness of food safety practices requires observing students in real-life kitchen and food preparation settings where they can demonstrate what they have learned. Our hope is to assist you with your evaluations by providing an easy-to-use observation template to assess students' food safety knowledge and practices. The information gathered will not only give you an indication of what students know and need to improve upon, but also provide you with useful insight about instructional design, educational materials, and opportunities for success. This Food Safety Practices Assessment tool will enable you to: 1) conduct observations of students as they demonstrate food safety practices, and 2) use this information to design classroom activities that are in keeping with students' Individual Education Plans (IEP).

Observing Students' Food Safety Practices

Use of this Assessment Tool to observe students' food safety practices is designed to minimize interference with classroom activities, and a simple check mark is all that is needed to record practices. Also, recording how often a food safety practice occurs produces a count, or number, that can be easily transferred to a graph or other data sheet to follow students' progress. A major challenge, however, to observing specific food safety practices within the four general categories described in the curriculum guide (Clean, Chill, Separate, Cook) is that they normally may not occur very often. For example, it would be easier to collect information about whether or not a student raised his/her hand to ask a question in class (a behavior that is expected to occur often) than it would be to check if he/she properly washed a cutting board after preparing raw chicken to cook. It is logical to assume that if washing a cutting board is not a practice that is expected to occur during an observation period, then it will probably not occur. For this reason, observations of Clean, Chill, Separate and Cook practices need to be scheduled when students' activities associated with these food safety practices would naturally occur.

Because you will be observing a sample of food safety practices as the students exhibit them and your sample will be relatively small, a certain level of detail will be needed. Therefore, we have included space on the Assessment form to briefly describe a number of things:

- *The observation session:* observation date, number of students being observed, length of the observation session, the menu, and specific food safety practices expected to occur.
- *The physical setting:* the location of the observation site (kitchen, preparation area, wash area, etc).
- *The people involved:* identify yourself as the observer and the students to be observed.
- *Students' roles:* include the role/s of each student to be observed as they relate to the foo safety practices (i.e., food preparer, cook, cleaner, etc).

Collecting Food Safety Practice Observation Data

Use the template in Appendix A as a framework when you make your observations of specific food safety practices. The template follows a standard format, but how you use it in your facility will be determined by the day's menu, the meal(s) being prepared, and by the particular food service activities you are interested in observing. The specific parts of the template are as follows:

Evaluating the effectiveness of food safety practices requires observing students in real-life kitchen and food preparation settings where they can demonstrate what they have learned. Our hope is to assist you with your evaluations by providing an easy-to-use observation template to assess students' food safety knowledge and practices. The information gathered will not only give you an indication of what students know and need to improve upon, but also provide you with useful insight about instructional design, educational materials, and opportunities for success. This

Appendix 6

Food Safety Practices Assessment

Food Safety Practices Assessment tool will enable you to: 1) conduct observations of students as they demonstrate food safety practices, and 2) use this information to design classroom activities that are in keeping with students' Individual Education Plans (IEP).

- *Check if Practice Observed:* A check mark would be made in this column each time you observe a food safety practice occurring at the proper time (e.g., washing hands before and after handling raw chicken).
- *Tally:* Record the total number of times each food safety practice has been observed during the observation period.
- *Total:* Calculate the number of times each food safety practice was actually observed (tally) divided by the number of times each practice was expected to occur. Dividing these two numbers and multiplying the answer by 100 will give you a percentage (%). For example, if during your observation session, hand washing was observed twice, but it was expected to occur 4 times, the total would be 50% [2 hand wash occurrences actually observed (tally) / 4 hand wash occurrences expected to be observed x 100 = 50%]
- *Comments:* Note any additional insight you gained related to food safety practices during the observation period.
- *Corrective Actions:* Make note of any actions you want to take to improve observed food safety practices.
- *Overall Performance Rate:* At the end of your observation session, you can calculate an overall performance rating for each category of food safety by adding up the number of times each food safety practice was observed, dividing this number by the number of times each practice was expected to occur, and multiplying the total by 100. For example, if hand was ing was observed twice and cleaning of food preparation work surfaces was observed once, that is a total of 3 observed occurrences (2+1 = 3). If, however, hand washing was expected to occur 4 times and cleaning of food preparation surfaces was expected to occur 2 times, that is a total of 6 expected occurrences (4+2 =6). Dividing the total observed (3) by the total expected (6) = .50 x 100 = 50% overall performance rating in the Clean food safety category.
- *Additional Comments:* Use this space for any additional information you want to record about the group you are observing and/or any individual student.

A case study example using the Assessment template is provided in Appendix B. Use this as is, or change it to fit your particular needs.

Once you have a template that meets your needs, you will need to decide how long your observation sessions will be. Because food safety practices occur at different times for different meal preparations, you need to decide what timeframe best fits the practices you want to observe. In other words, rather than specifying that you should always conduct your observations over a 15-minute timeframe, it would be more useful to link the observation time to the food preparation situation you want to observe, which may be more or less than 15 minutes. In this way, the observation can be built around the opportunity when the food safety practices are most likely expected to occur, rather than around a set time period.

Other Considerations

Because there are limited opportunities for students to demonstrate specific food safety practices, it may be a good idea to think about a few other considerations before getting started, especially if you are not used to conducting observations. Specifically, we suggest the following:

Appendix 6

Food Safety Practices Assessment

1. Become familiar with the kitchen setting, the routine, schedule, etc.
2. Meet with all personnel who may be involved in the kitchen setting at the time of the obse vation to check procedures, routines, their roles (if any), etc. This will be particularly impor tant if you will be observing multiple people at the same time.
3. Determine ahead of time the best place to stand, sit, or move to be able to directly observe student(s) without interfering with usual operations.
4. Minimize interactions with the students being observed during the observation period.
5. If you chose to use an observer who is not known to the students, he/she should not be introduced to the students at the beginning of the observation session. The teacher should instruct the students prior to the observation that a person will be observing them and the reason for the observation.
6. Enter the observation area as naturally as possible.
7. If possible, limit the number of observers to one to minimize disruption of work flow.

Evaluating the effectiveness of food safety practices requires observing students in real-life kitchen and food preparation settings where they can demonstrate what they have learned. Our hope is to assist you with your evaluations by providing an easy-to-use observation template to assess students' food safety knowledge and practices. The information gathered will not only give you an indication of what students know and need to improve upon, but also provide you with useful insight about instructional design, educational materials, and opportunities for success. This Food Safety Practices Assessment tool will enable you to: 1) conduct observations of students as they demonstrate food safety practices, and 2) use this information to design classroom activities that are in keeping with students' Individual Education Plans (IEP).

Developed by

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Student-Based Food Safety Practices

Observation Form

DATE _____ OBSERVER _____

START TIME _____ END TIME _____ NUMBER OF STUDENTS _____

INITIALS OF STUBENT BEING OBSERVED _____ LOCATION _____

ASSIGNED ROLE(S) OF EACH STUDENT _____

MENU (TO BE COMPLETED PRIOR TO OBSERVATION)

RECORD ONE TALLY MARK FOR EVER OCCURRENCE OF EACH PRACTICE OBSERVED

FOOD SAFETY CATEGORY	OBSERVABLE PRACTICE	CHECK IF PRACTICE OBSERVED	TALLY (OBSERVED)	TOTAL OBSERVED/ EXPECTED = %	COMMENTS	CORRECTIVE ACTION
CLEAN	wash hands properly clean food prep work surface pre-wash fresh fruits/vegetables wash cutting board and utensils clean spills other					
				Overall Performance Rate:		
CHILL	keep all foods that need refrigeration (cheese, milk, eggs, deli meats) at appropriate temperature check freezer temperature chill hot foods properly other					
				Overall Performance Rate:		

FOOD SAFETY CATEGORY	OBSERVABLE PRACTICE	CHECK IF PRACTICE OBSERVED	TALLY (OBSERVED)	TOTAL OBSERVED/ EXPECTED = %	COMMENTS	CORRECTIVE ACTION
SEPARATE	use a separate cutting board for raw meat or properly wash the board between uses use separate utensils for meat/fish demonstrate proper storage of meat/fish other					
				Overall Performance Rate:		
COOK	use termometer to check internal cooking temperature other other other					
				Overall Performance Rate:		
OTHER (Personal hygiene practices)	wear proper hair restraint wear gloves demonstrate proper care of cuts demonstrate proper tasting practices					
				Overall Performance Rate:		

Note: Some practices may be assigned to individuals performing certain roles in the kitchen that may not be observable in all individuals (ex: checking freezer or refrigerator temperatures, proper storage of foods, etc.)

Additional comments:

Case Study, Cold Entrée Example

On Tuesday, July 16th, the following lunch menu is planned for the East Coast High School in Middletown, USA.

- Egg salad sandwich with lettuce, tomato and mayonnaise
- Celery with Ranch dip
- Cole slaw with carrots
- Canned pear halves
- Brownie with peanut butter chips

It's 8:30 a.m. and Peter, the food service manager, is in the kitchen with three of his staff: Hannah and Bob, the two salad prep cooks, and Roman, the line cook. Because it's so hot outside, a cold entrée is planned for lunch. Hannah and Bob get busy preparing the vegetables and fruits. They need to clean and sanitize the work surface areas, then wash the celery, carrots, lettuce and tomatoes, slice the tomato, chop the celery, and shred the cabbage. Meanwhile, Roman is peeling and chopping the eggs that he hard boiled the day before for the egg salad, next he will add the mayonnaise, some dry mustard and seasonings to make the egg salad. Peter is overseeing things and cutting the brownies for dessert. Later he will portion out the pear halves from the cans in the storage area.

With a menu like this, basic food safety practices of proper cleaning, chilling and sanitation practices can be observed. It is expected that all food service workers will properly wash their hands prior to starting their work in the kitchen (this does not mean wetting their hands under water without soap). They should all be a wearing hair restraint and gloves. Hannah and Bob are working with fresh produce, all of which should be washed prior to prep work. After the tomatoes and celery are cut, the cutting board and knives should be cleaned, sanitized and properly stored. The cabbage will be shredded using a food processor, which also needs to be put into the dishwasher after use. The mayonnaise for the coleslaw and egg salad should remain in the refrigerator until needed (not sit out on the counter). After the coleslaw is made, it should be covered and stored in the refrigerator. When the eggs are peeled and mixed with the dressing and flavorings, the egg salad should also be covered and stored in the refrigerator until it's ready to be served. The cans of pears need to be cleaned, opened and portioned out right before service. The Ranch dressing dip should be refrigerated after opening and remain refrigerated until right before serving.

Student-Based Food Safety Practices

Observation Form

July 16, 2009	*P. Smith*
DATE	OBSERVER
8:30 a.m. *9:30 a.m.*	*3*
START TIME END TIME	NUMBER OF STUDENTS
HC, RW, RO	*Kitchen, East Coast HS*
INITIALS OF STUBENT BEING OBSERVED	LOCATION
2 salad prep cooks, 1 line cook	
ASSIGNED ROLE(S) OF EACH STUDENT	

MENU (TO BE COMPLETED PRIOR TO OBSERVATION)

egg salad sandwich with lettuce, tomato and mayonaise
celery with ranch dip
cole slaw
canned pear halves
celery with ranch dip
brownie with peanut butter chips

RECORD ONE TALLY MARK FOR EVER OCCURRENCE OF EACH PRACTICE OBSERVED

FOOD SAFETY CATEGORY	OBSERVABLE PRACTICE	CHECK IF PRACTICE OBSERVED	TALLY (OBSERVED)	TOTAL OBSERVED/ EXPECTED = %	COMMENTS	CORRECTIVE ACTION
CLEAN	wash hands properly	✔	*1, 1, 1*	*3/4 = 75%*	*One student did not wash his hands after taking a call on his cell phone.*	*Follow up with student regarding use of cell phones in the kitchen area.*
	clean food prep work surface	✔	*1, 1*	*2/2 = 100%*		
	pre-wash fresh fruits/vegetables	✔	*1, 1, 1*	*3/4 = 75%*	*Celery was not washed prior to choppong it.*	*Remind students of the need to wash all fresh produce*
	wash cutting board and utensils	✔	*1*	*1/1 = 100%*		
	clean spills	✔	*1*	*1/1 = 100%*		
	other *rinsed off lids of pear cans*					
				Overall Performance Rate: *10 (observed) / 12 (expected) overall performance = 83%*		
CHILL	keep all foods that need refrigeration (cheese, milk, eggs, deli meats) at appropriate temperature	✔	*1*	*1/2 = 50%*	*Mayonaise was left out on counter.*	
	check freezer temperature					
	chill hot foods properly					
	other					
				Overall Performance Rate: *1 (observed) / 2 (expected) overall performance = 50%*		

FOOD SAFETY CATEGORY	OBSERVABLE PRACTICE	CHECK IF PRACTICE OBSERVED	TALLY (OBSERVED)	TOTAL OBSERVED/ EXPECTED = %	COMMENTS	CORRECTIVE ACTION
SEPARATE	use a separate cutting board for raw meat or properly wash the board between uses use separate utensils for meat/fish demonstrate proper storage of meat/fish other					
				Overall Performance Rate: ***N/A***		
COOK	use termometer to check internal cooking temperature other other other					
				Overall Performance Rate: ***N/A***		
OTHER (Personal hygiene practices)	wear proper hair restraint	✔	***1, 1***	***2/3 = 66%***	***One student was not wearing proper hair restraint.***	***Remind student of the need to wear hair restraint.***
	wear gloves	✔	***1, 1, 1***	***3/3 = 100%***		
	demonstrate proper care of cuts					
	demonstrate proper tasting practices	✔	***1***	***1/2 = 50%***	***One student used the same spoon twice to taste the egg sallad.***	***Review proper tasting practces.***
				Overall Performance Rate: ***6 (observed) / 8 (expected) overall performance = 75%***		

Note: Some practices may be assigned to individuals performing certain roles in the kitchen that may not be observable in all individuals (ex: checking freezer or refrigerator temperatures, proper storage of foods, etc.)

Additional comments:

Implications

Review of the data collected while the students prepared the cold entrée in this case study indicates that certain food safety practices need additional instruction or review. Overall Performance Rates for observed food safety practices ranged from a 50% for Chilling foods, to 75% for Other (personal hygiene) practices, to 83% for Cleaning. Instruction would therefore focus on the specific practices in need of improvement, including properly cleaning vegetables, hand washing, keeping foods adequately chilled, and personal hygiene such as wearing a hair restraint and tasting practices.

Appendix 7

Foodservice Application of Curriculum

Introduction

This appendix includes information and resources which give the lessons and student activities a foodservice application. The temperatures, handwashing times, and cooling times included are based on the current Food and Drug Model Food Code. The Food Code is a collection of regulations governing foodservice operations that includes requirements for illness reporting, handwashing, time and temperature control, final cooking temperatures and much more. A copy of the current FDA Model Food Code may be found at http://www.cfsan.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode/default.htm. Note: The temperatures listed in the curriculum are not those necessarily used in foodservice operations, but are those promoted by the USDA for use by consumers. However, not all health regulatory authorities have adopted the FDA Model Food Code. To insure you are providing your students with correct information, you should check with your local health regulatory authority concerning regulations relating to the operation of foodservice establishments. This information can usually be found on their websites. The accompanying CD#1 contains a Power Point presentation that includes a selection of slides that supports each food safety principle discussed in this section.

- Unit 1 Student Overview to Food Safety
- Unit 2 The Microworld
- Unit 3 Fight BAC! Principle: Clean
- Unit 4 Fight BAC! Principle: Separate
- Unit 5 Fight BAC! Principle: Cook
- Unit 6 Fight BAC! Principle: Chil
- Unit 7 Putting It All Together

An individual employed in any position in the foodservice industry should have a basic understanding of the following key food safety principles:

1. The relationship between foodborne illness and personal hygiene
2. Time and temperature control
3. Cross contamination
4. Cleaning and sanitizing

Listed under each of the above mentioned food safety principles are the units, lessons, and student activities that apply to the principle. What follows is a listing the food safety principles and the lessons and supporting activities. Also included are suggested teaching points that focus on foodservide to stress for a foodservice application. The slides in the Power Point presentation that correspond with the unit and food safety principle are also listed. This section of the Appendix also includes “Food Safety Facts for Food Workers,” which may be helpful in reinforcing the food safety foodservice concepts presented in the curriculum.

1 Relationship between Foodborne Illness and Personal Hygiene

Unit 3 Fight BAC! Principle: Clean
(CD #1 Foodservice File, Slides 1–5)

Lesson 2 Handwashing
Handwashing/limited bare hand contact with ready-to-eat foods
(CD #1 Foodservice)

Teaching Points

Instructional Outline

Notes
- Handwashing method remains the same, but hands should be washed for at least 15 seconds.
- Foodservice workers must wear single-use plastic gloves when handling any ready-to eat food, i.e. bread, rolls, fresh fruits and vegetables.

Stress:
- Washing hands before putting on gloves
- Gloves must always be changed between food handling activities, i.e. handling raw meat fish or poultry and then handling ready-to-eat foods, i.e. bread, fruit, salad greens.
- Never reuse gloves
- Alternative methods to handling ready-to-eat foods, i.e. using utensils, napkins, deli paper.

Note: It is important to remind students that they should not work if they are ill with any type of nasea and/or diaffhea and/or vomiting type illness. They should also not ne handling food if they have open cuts or wounds. In many jurisdictions, emplotees must sign illness reporting statements which describe illnesses and restrict them from working with food. Check with your local regulatory authority about their regulations.

Lesson 3-2 Keeping It Clean: Clothing
(CD #1 Foodservice)

Notes
- Overall good personal hygiene is necessary in the foodservice environment.

Stress:
- Always take a shower before going to work
- Wear clean clothing/uniform and apron
- Change the apron if it gets dirty
- Wear little or no jewelry when handling food. Jewelry can fall into food and can also harbor harmful microbes.
- Nail polish or fake nails should not be worn
- Keep hair neat, clean and covered
- Cover cuts and wounds on fingers and hands with water resistant bandages and a single-use glove

2 Time and Temperature Control

The principles of time and temperature control remain the same. However, there are different times and temperature requirements for cooking, cooling and hot-holding. Those listed in the current FDA Model Food Code are included in each of the lessons.

The term "potentially hazardous foods" (time/temperature control for safety) foods should be defined. This refers to a food that requires time/temperature control for safety (TCS) to limit pathogenic microorganism growth or toxin formation.

***Note:** In the current FDA Model Food Code and future codes potentially hazardous foods are being referred to time/temperature control for safety foods.

Foods considered PHF (TCS Foods*)

1. Raw or heat-treated animal food, meat, seafood, and poultry
2. Cooked rice or pasta
3. Heat-treated plant food
4. Raw seed sprouts
5. Cut melons and tomatoes
6. Garlic-in-oil mixtures not modified to prevent pathogenic microorganism growth or toxin formation
7. eggs
8. Milk

Unit 2 The Microworld

(CD #1 Foodservice)

This unit reinforces the fact that bacteria that cause foodborne illnesses need time and the right temperature to grow and become present in a food in large enough numbers to make someone sick.

Unit 5 Fight BAC! Principle: Cook

(CD #1 Foodservice File, Slides 6–17)

All the lessons and student activities in this unit may be used. According to the current FDA Model Food Code the Temperature Danger Zone (TDZ) is 41°F to 135°F. Also note that the time food may be in the Temperature Danger Zone is four hours (for consumers it is two hours) and the time is cumulative.

- **Hot-holding temperature**
  135°F**.** Must heat to 165°F to hold hot at 135°F. Food may be reheated only once.
- **Final cooking temperatures**
  - Poultry and stuffed meats: 165° F for 15 seconds.
  - Ground pork and ground beef: 155° F for 15 seconds.
  - Eggs and pork: 145° F for 15 seconds
  - Final cooking temperatures for other PHF (TCS Foods) may be found in the current FDA Model Food Code. Check this section (3401.11–14) of the food code for criteria for cooking beef, lamb or pork roasts.
- **Microwave Cooking**
  - Heated to a temperature of at least 165°F in all parts of the food and allowed to stand covered for two minutes after cooking

Unit 6 Fight BAC! Principle: Chill

(CD #1 Foodservice #19–#25)

All the lessons and student activities unit may be used. The cooling methods all apply to foodservice.

Cooling

The requirements for cooling are 135°F to 70°F in two hours, then cool to 40°F within a total of six hours. Note: If cooling from 135°F to 70°F in one hour then have five hours to get to 70° F.

3 Cross Contamination

Unit 4 Fight BAC! Principle: Separate

(CD #1 Foodservice Files, Slides 26–30)
All the lessons and student activities unit may be used.

Lesson 4-1 Separate: Don't Cross-Contaminate

Teaching Points
(CD #1 Foodservice)
Stress:

The role that good personal hygiene plays in preventing cross contamination, especially hand washing.

- The proper use of single-use plastic gloves (change between jobs).
- Proper sanitation of utensils, cutting boards and work surfaces/areas.
- The correct way to serve food (i.e. fingers should not come in contact with any food on the plate). Also, the correct way to serve beverages. Note: The Food Safety Smart 10-minute video and picture file contain photos to illustrate this point.

Lesson 4-3 Storage
(CD #1 Foodservice)

Notes
Stress:

- The importance of checking all food products when they are received. The food product's package should not be damaged in any way.
- The temperature of refrigerated foods should be taken immediately and recorded.
- Do not overload the refrigerator.
- Foods stored in dry storage should be stored six inches above the floor and on shelving that is six inches away from the wall. Dry storage areas should be kept clean.
- The importance of labeling and dating food products, both refrigerated and those kept in dry storage.
- Practice FIFO: First In First Out.
- Always store cooked or ready-to-eat foods above raw foods.

4 Cleaning, Sanitation and Food Safety

Unit 3 Fight BAC! Principle: Clean

(CD #1 Foodservice Files, Slides 36–43)
General information about kitchen safety should be included in this area. This includes information on accident prevention and fire safety.

Lesson 3-3 Keeping It Clean: Surfaces, Utensiles, and Storage Areas

As the curicculum targets consumer's practices in their homes, sanitizing with chemicals such as chlorine bleach is not addressed. The issue of the correct sanitizing procedures for equipment, dishes, glasses, pots and pans, utensils, etc. used to prepare and serve food should be addressed. Also, the proper procedures for sanitizing any food contact areas including counters, cutting boards, etc. should be addressed.

Instructional Outline

Teaching Points

Stress:

- The difference between clean and sanitary, i.e. an item must be clean before it can be sanitized.
- There are two methods used to sanitize:
  Heat: The higher the heat the shorter the time required to kill microorganisms.
  Chemical: Three common types of sanitizing chemicals arechlorine, iodine or quaternary ammonium. To sanitize, spray or immerse.
- Always follow the manufacturer's instructions when preparing the sanitizer.
- Check periodically to be sure the sanitizer is still doing its job. Use a test strip.
- Cleaning supplies should be stored away from food.

Student Activities

Any of the activities may be slightly modified by using a chemical sanitizer rather than warm water for the third step in the cleaning process. Note: If chemical sanitizers are to be used, there should be a Material Safety Data Sheet (MSD) available to students. Also, the instruction on their proper use should be through following manufacturer's instruction for use.

Foodservice Training Resources

1. Food Marketing Institute, Super Safe Mark Quick Reference, Retail Best Practices to Food Safety and Sanitation
   (www.fmi.org/forms/store/CommercePlusFormPublic/search? action=Feature)
2. Massachusetts Partnership for Food Safety Education, *Food Safety for Food Workers*
3. National Restaurant Association Educational Foundation: SevSafe Employee Guide
   (www.nraef.org)
4. NEHA Training, Food Safety First Principles
   (www.nehatraining.org/products/fsfp.htm)

• Massachusetts Parternship for Food Safety Education •

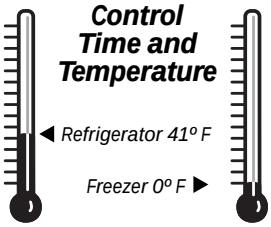
Food Safety for Food Workers

Most foodborne illness can be avoided by handling food properly. Foods from animal sources and cooked beans, rice and pasta are especially risky. These foods are "Potentially Hazardous Foods" (PHFs). Follow these basic food safety principles and practices to keep the food you prepare and serve safe to eat. These recommendations are consistent with the FDA 1999 Food Code.

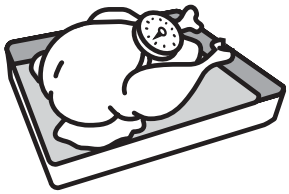
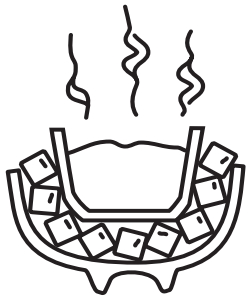
STAY HEALTHY

Key Principle	Hazard	Food Safety Message
Be in Good Health	**Microbiological Contamination**	• Don't prepare food when you are ill or have an open cut or sore on your hands or arms. • Report illnesses to the manager. • Avoid coughing and sneezing in food areas.
Practice Good Personal Hygiene 	**Microbiological Contamination**	**Always wash your hands after you:** • use the restroom. • cough, sneeze, or use a handkerchief or tissue. • work with raw foods. • handle dirty equipment or utensils. • take out the garbage.
	Cross-contamination	• Use a designated hand sink.
	Physical Contamination	• Wear clean clothing on the job.
	Microbiological and Physical Contamination	• Wear effective hair restraint while working in a food preparation area. • Don't eat, drink or smoke while preparing food. • Keep nails trimmed.

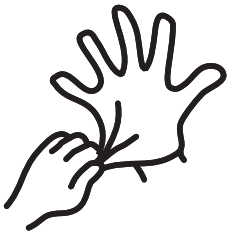
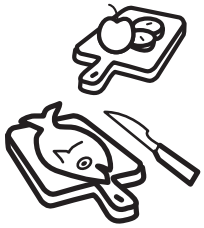
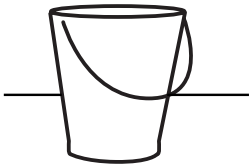
CONTROL TIME AND TEMPERATURE

Key Principle	Hazard	Food Safety Message
	**Bacterial Growth, Toxin Production**	**Keep foods out of the "Danger Zone": 41ºF - 140ºF** • Use a calibrated food thermometer to check food temperatures. **Receive and store food at proper temperatures** • Refrigerated foods at 41ºF or below. • Frozen foods at 0ºF or below.
During Preparation	**Bacterial Growth, Toxin Production**	**Thaw frozen foods in:** • Refrigerator. • Potable cold running water below 70ºF for 2 hours or less. • Microwave oven followed by cooking or as part of the cooking process.

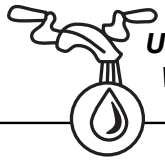
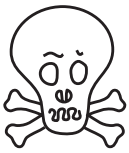
CONTROL TIME AND TEMPERATURE

Key Principle	Hazard	Food Safety Message
Control Time & Temperature ***During Cooking*** 	**Bacterial Survival, Toxin Production**	**Cook each food to proper internal temperature:** • ***165ºF for 15 seconds:*** poultry, stuffed meat, fish, pasta and stuffing containing meat, poultry or fish. • ***165ºF for 15 seconds:*** ground poultry, turkey. • ***155ºF for 15 seconds or 158ºF instantaneously:*** for ground meats (comminuted and injected meats) and the following comminuted: fish, meat and raw eggs not prepared for immediate consumption. • ***145ºF for 15 seconds***: fish, meat, pork and raw shell eggs that are intended for immediate service. • ***145ºF for 3 minutes:*** whole beef roasts, whole pork roasts and corned beef roasts. • ***145ºF on the top and bottom surface*** of a beef steak labeled to indicate that it meets the definition of "whole muscle intact beef." • ***165ºF raw animal foods*** cooked in a microwave.
During Holding	**Bacterial Growth, Toxin Production**	• Hold hot Potentially Hazardous Foods (PHFs) at 140ºF and above. • Hold cold PHFs at 41ºF or below.
During Cooling 	**Bacterial Growth, Toxin Production**	**Cool cooked Potentially Hazardous Foods (PHFs):** • 140ºF to 70ºF in 2 hours or less. • 70ºF to 41ºF in 4 hours or less. • Cool foods prepared cold to 41ºF or less within 4 hours. • Date and mark cold foods prepared on-site and held for more than 24 hours with the date of discard: • at 41ºF - 7 days including date of preparation • at 45ºF - 4 days including date of preparation • Cool foods in shallow containers (4 inches or less).
During Reheating	**Bacterial Survival and Growth, Toxin Production**	• Rapidly reheat PHFs to 165ºF (2 hours or less) and hold at 140ºF.

PREVENT CONTAMINATION

Key Principle	Hazard	Food Safety Message
Protect Food from Contamination 	**Microbiological and Physical Contamination**	• Prevent bare-hand contact with ready-to-eat foods by using utensils like disposable gloves, deli tissue, spatulas, tongs or dispensing utensils. • Minimize bare-hand contact with exposed foods that are not in ready-to-eat form. • Store food in covered containers or original packaging. • Do not store packaged food in absorbent packaging in direct contact with ice or water. • Do not store unpackaged food in direct contact with undrained ice. • Wash fruits and vegetables before cooking or serving. • Store foods in a clean, dry location that is not subject to splash, dust or other contaminants and is 6 inches above the floor.
Prevent Cross-contamination 	**Cross-contamination**	• Separate raw animal foods from ready-to-eat animal foods and other ready-to-eat foods (sushi, molluscan shellfish, fruits and vegetables) during storage, preparation, holding and serving.
	Microbiological Contamination	• Clean and sanitize food thermometers before and after each temperature check of raw and ready-to-eat foods.
	Cross-contamination	• Do not mix raw animal foods with cooked food.
Keep Food Contact Surfaces Clean  	**Microbiological Contamination**	**Clean and sanitize food contact equipment and utensils:** • Before you use a different type of raw animal food (beef, fish, lamb, pork and poultry). • When you change from working with raw foods to working with ready-to-eat foods. • Between preparing raw fruits and vegetables and Potentially Hazardous Foods. • At any time during the operation when contamination may have occurred. • Every 4 hours if used with Potentially Hazardous Foods at room temperature greater than 55ºF. • Clean and sanitize food thermometers before using and storing.

KEEP YOUR FOOD SUPPLY HEALTHY

Key Principle	Hazard	Food Safety Message
Consider the Source and the Condition of the Food	**Microbiological, Physical and Chemical Contamination**	• Use foods from approved suppliers. • Do not use food prepared in a private home. • Do not use food from bulging or dented cans or from damaged packaging.
 ***Use Safe Water***	**Microbiological and Chemical Contamination**	• Use only safe, potable water. • Ice for food use must be made from potable water.
Use Safe Transportation/ Travel	**Microbiological and Chemical Contamination**	• Protect food from contamination during transportation. • Transport in clean vehicles and equipment. • Keep refrigerated foods cold (41ºF or below). • Keep hot foods hot (140ºF or above).
Use and Store Chemicals and Pesticides Safely 	**Chemical Contamination**	• Store and use only chemicals that are absolutely necessary. • Use chemicals in accordance with manufacturers' instructions. • Do not store chemicals where they can contaminate food equipment, utensils, linens and single service/single use articles. • Only licensed individuals should apply pesticides.

The Massachusetts Partnership for Food Safety Education is a collaboration established among the University of Massachusetts Extension Nutrition Education Program and state and federal agencies and associations working with consumers, regulators and food workers in food preparation, processing, food service and retail establishments. Its goal is to reduce foodborne illnesses in Massachusetts by:

- *Improving food safety knowledge and skills among target groups*
- *Educating target groups in a systematic approach to food safety*
- *Increasing collaborations and communication among partners*

Participating agencies include:

- MA Department of Education
- MA Department of Food & Agriculture
- MA Department of Public Health
- MA Environmental Health Association
- MA Executive Office of Elder Affairs
- MA Food Association
- Massachusetts Food Banks
- Massachusetts Head Start Programs
- MA Health Officers Association
- MA Milk, Food & Environmental Inspectors Association
- MA Restaurant Association
- MA School Food Service Association
- US Department of Agriculture - Food & Nutrition Service (NERO)
- US Department of Agriculture - Food Safety & Inspection Service
- US Food and Drug Administration

Massachusetts Department of Education

United States Department of Agriculture cooperating. Developed by the UMass Extension Nutrition Education Program with support from the Massachusetts Department of Education in cooperation with the Massachusetts Partnership for Food Safety Education. UMass Extension provides equal opportunity in programs and employment. NU-0139:07/2002.

EXTENSION

Appendix 8

General Food Safety Resources

Online Resources

1. URI Cooperative Extension Food Education Program (http://www.uri.edu/ce/ceec/foodsafety.html)
2. Gateway to all federal food safety resources (http://foodsafety.gov)
3. Partnership for Food Safety Education (http://www.fightbac.org)
4. USDA Home Page (http://www.usda.gov)
5. Food Safety and Inspection Service (USDA) Home Page (http://www.fsis.usda.gov)
6. USDA National Agricultural Library (http://www.nal.usda.gov)
7. USDA Foodborne Illness Information Center (http://www.nal.usda.gov/fnic/foodborne/food born.htm)
8. FDA Home Page (http://www.fda.gov)
9. FDA Center for Food Safety and Applied Nutrition (http://www.cfsan.fda.gov)
10. International Food Information Council (http://www.ificinfo.health.org)

Telephone Resources

1. Local Cooperative Extension Office
2. Local or state food regulatory agency
3. US FDA's Food Information line-1800-FDA-4010
4. USDA's Meat and Poultry Hotline-1-800-535-4555

Appendix 9

References

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