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AP-10/19/10
Strate Info. - 11/2/10

Received
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Undergraduate Distance Education Review Form
(Required for all courses taught by distance education for more than one-third of teaching contact hours)

Liberal Studies

Existing and Special Topics Course

Received

Course: FDNT 150 Foods Lecture

SEP 21 2010

Instructor(s) of Record: Diane C. Wagoner MS RD LDN

Liberal Studies

Phone: 357-3578

Email: dwagoner@iup.edu

Step One: Proposer

A. Provide a brief narrative rationale for each of the items, A1- A5.

1. How is/are the instructor(s) qualified in the distance education delivery method as well as the discipline?

This will be my third on line course. I have been teaching FDNT 143 Nutrition and Wellness via the online format since the summer of 2000 and have also taught FDNT 213 Lifecycle Nutrition since the summer of 2008. I was trained extensively in WebCt, completing the Introduction to WebCt and Managing WebCT Students Accounts workshops in fall of 2000. Since the inception of Moodle I have completed the Introduction to Moodle and Managing Quizzes training offered by IT Services. I have been utilizing the Moodle Course Management System (CMS) since it was first introduced. Additionally in the fall of 2004 I enrolled and completed a distance education course as a "student" through the University of Phoenix. The Course Management System used was the discussion tool in Microsoft Outlook Express. While I have not used this format since then, participating in the course as a student and using a completely different management tool taught me a great deal regarding the use interactive teaching strategies via distance education.

Regarding my discipline: I am an Assistant Professor for the Department of Food and Nutrition and have taught 9 different courses both undergraduate and graduate level since my employment at IUP in 1993. I have an MS in Food and Nutrition and have been a registered dietitian for 22 years. I have taught FDNT 150 Foods Lecture in the traditional face to face (podium) format since 2008. Prior to my employment at IUP I worked extensively in the food service industry, specifically in schools and skilled nursing care.

2. How will each objective in the course be met using distance education technologies?

There will be five modules. (Each module will include specific objectives or topics to be covered). Each module/topics will include a detailed Power Point component, assigned readings from the text, assigned worksheet or discussion questions and /or a timed practice quiz. Each module will include a timed exam.

- **Describe the gross chemical composition (with respect to proteins, fats, carbohydrates, vitamins, minerals, and water) of foods and food systems.**
While the chemical composition of nutrients are addressed in more detail throughout the course, (chemical composition and proteins: meat and dairy) this objective is further met by directing the student:
 - To read the Food Composition chapter of their text
 - Complete a worksheet assignment
 - Complete a timed quiz.

- Research food science experiment/results via the internet and post their findings in the discussion forum. Possible websites they might use as a reference are:
 - <http://www.all-science-fair-projects.com>
 - <http://school.discoveryeducation.com/>
 - <http://www.exploratorium.edu/cooking/>

- **Explain the relationship between the chemical and physical properties of proteins, fats, carbohydrates, vitamins, minerals, and water in food composition and food systems.** For each food, food group or food topic the student will be directed to read the appropriate chapter, complete an assignment or worksheet and complete a timed quiz. Worksheet questions make reference to the chemical and physical properties of a particular nutrient. For example:
 - What determines whether or not a starch will undergo gelation?
 - Briefly describe the appearance of a cut piece of cherry pie made with a corn-starch thickener vs. all-purpose thickener
 - Why does toasted bread taste sweeter than untoasted bread?
 - Why do greens become duller in color when cooked? Discuss the scientific principles involved.

Note: In some instances I might pose similar questions, requiring the student to participate in a discussion forum. The students are encouraged to use reputable internet resources in addition to their text to answer the questions.

- **Describe the principles of preparation used for foods and food products.** While the principles of preparation used for foods and food products are addressed in more detail throughout the course, (principles of preparing vegetables differ than those used for quick breads) this objective is further met by directing the student to:
 - Read the Food Preparation Basics chapter of their text
 - Complete a worksheet assignment which addresses methods of cooking, types of heat, measuring ingredients, mixing techniques and food presentation.
 - Additionally the student is directed to respond to various discussion questions and share their responses in the discussion forum. Examples of the discussion questions might be:
 - Describe the various mixing techniques and indicate the advantages and/or disadvantages of each. For each technique, provide an example of a food product for which it would be used.
 - Give at least five examples of moist-heat and dry-heat preparation techniques, including the best types/cuts of foods for each method, and indicate how each method can affect the final food product. Provide the positive and negative nutritional aspects of each cooking method.
 - Why is it important to use the correct potato for either dry- or moist-heat cookery methods? Suggest appropriate potatoes to be used for the above cooking methods. What can be done to make the color of mashed potatoes whiter?

Note: In some instances I might pose similar questions, requiring the student to participate in a discussion forum. The students are encouraged to use reputable internet resources in addition to their text to answer the questions.

- **Describe how various preparation techniques affect the composition of foods and food products.**

For each food, food group or food topic the student is directed to read the appropriate chapter, complete an assignment or worksheet and complete a timed quiz. Worksheet questions make reference to food preparation techniques and their affect on the composition of foods/food products. For example:

- What roles are played by heat, acid, alkali, metals, cooking times, temperatures, and cooking methods for vegetables and legumes? What effects do these factors have on the final products?
- Define the difference between braising and stewing. Provide an example of when you might use each technique. Support your answer.
- Define a minimum of 3 methods of tenderizing meat and discuss when each method would be appropriate. Support your answer.

Note: In some instances I might pose similar questions, requiring the student to participate in a discussion forum. The students are encouraged to use reputable internet resources in addition to their text to answer the questions.

- **Explain how various preparation techniques affect the nutritional value of food and food products.**

For each food, food group or food topic the student is directed to read the appropriate chapter, complete an assignment or worksheet and complete a timed quiz. Worksheet questions make reference to food preparation techniques and their affect on the nutritional value of foods/food products. For example:

- Discuss nutrient retention of vegetables in the various preparation and cooking processes. What foods contain phytochemicals and why are they important in our diet?
- How does heat affect the nutrient content of citrus fruits?
- How might nutrients be "preserved" in the cooking of vegetables? Support your answer.
- How does the nutrient content of legumes differ from that of most other vegetables?

Note: In some instances I might pose similar questions, requiring the student to participate in a discussion forum. The students are encouraged to use reputable internet resources in addition to their text to answer the questions.

- **Describe the basics of food safety.**

While Food Safety principles are reiterated throughout the course content the student will be directed to read the appropriate chapter, complete an assignment or worksheet and complete a timed quiz. Additionally the student will be required to research various food safety programs. Some possible examples might be: Partnership for Food Safety Education at www.fda.gov : HACCP management system at www.fsis.usda.gov: Food Safety and Inspection Service at www.fightbac.org. Based on their research as well as readings from the text and the PPT provided students will be directed to:

- Complete the "How Safe is Your Kitchen?" quiz located at <http://www.homefoodsafety.org/index.jsp>
- Observe someone else prepare a meal or "working in the kitchen" and identify areas of concern in terms of food safety, make suggestions supported by research.

- **Describe the basics of menu planning.**

While basics of menu planning are reiterated throughout the course content the student is directed to read the appropriate chapter, complete an assignment or worksheet and complete a timed quiz. Additionally the student is required to reference www.mypyramid.gov , www.mealsmatter.org

and www.rd411.com and complete a menu planning exercise that addresses the following considerations: economics, nutrition, food preparation, and food presentation. This assignment is considered a culminating activity and is usually required near the end of the course.

- **List and explain the laws and regulatory agencies involved in the control of US food systems.** While the laws and regulatory agencies involved in the control of US food systems are reiterated throughout the course content the student is directed to read the appropriate chapter, complete an assignment or worksheet and complete a timed quiz. The student will also be required to complete discussion questions requiring them to visit various regulatory websites (www.fda.gov, www.usda.gov, www.ftc.gov) Examples of some discussion questions might be:
 - Draw an organizational chart that depicts the federal agencies in control of food regulations. Discuss the rationale for a single oversight agency.
 - Are there acceptable levels of contaminants in certain foods? If so, discuss these allowable contaminants and provide examples of foods and specific levels of filth.
 - Define *food additives* and discuss the safety of food additives. What foods are exempt from definition of a food additive? How do food additives obtain Food and Drug Administration (FDA) approval? What is the Delaney Clause and which foods have been identified?
 - What is the difference between qualified and unqualified health claims? Which type is most reliable? Give examples of and discuss the qualified health claims allowed by the Food and Drug Administration (FDA). What are the essential components of a

Note: In some instances I might pose similar questions, requiring the student to participate in a discussion forum. The students are encouraged to use reputable internet resources in addition to their text to answer the questions.

3. How will instructor-student and student-student, if applicable, interaction take place?

The primary location for interaction between student-student and instructor - student will be the discussion tool. When I pose a discussion question to the student they will be directed to use the discussion forum for purposes of sharing information and their own ideas. They will be asked to support their "answer" with relevant material learned from the course content. In some cases they may be asked to respond to each other's posts. As the instructor I will respond to discussion posts within 24 hours of the due date. Additionally the quick mail features of Moodle will be used for instructor-student communication. Students will be directed to read email a minimum of 1 time per day. Students may email me with any questions and are asked to allow 24 hours for a response.

4. How will student achievement be evaluated?

This course will be divided into 5 Modules. Each module will address specific topic areas. For each Module the student will be evaluated on the completion of the following types of activities:

- **Practice Quizzes:** Quizzes will be administered via Moodle(CMS) and available to students on a limited basis regarding dates/time to complete. Students will be permitted to take the practice quiz two times where the highest score counts. Questions will be randomly selected from a test bank pool which pertains to the "topic" thus each time the student takes the practice quiz they may or may not get some of the same questions. Questions will include multiple choice and matching that can be computer scored. Students will receive immediate feedback on quiz scores and often, specific feedback regarding rationale for the question's answer.

Note: Specific feedback and correct answers will not be released until the quiz is closed.

- **Discussion Questions:** Discussion questions for various topic areas. Occasionally the student will be required to post their responses in a forum for purposes of sharing responses with their peers.
- **Participation in on-line discussions:** Periodically posed/assigned by the instructor. The students will be expected to respond to the questions as well as comments made by other students.
- **Completion of Worksheets:** Several worksheets will be assigned usually in cases where discussion question format is not appropriate.
- **Exams:** There will be an exam for each module. Exams will be administered via Moodle (CMS) and available to students on a limited basis regarding dates and times to be completed. Questions will include multiple choice and matching that can be computer scored. Students will receive immediate feedback on exam scores once the exam is "closed".

5. How will academic honesty for quizzes and assignments be addressed?

Students will be expected to adhere to the University Academic Integrity Policy. A random test bank and timed exams will be used. Practice quizzes will also be timed. Questions and answer choices will be scrambled. Quizzes are also set up within Moodle to prohibit printing. Discussion questions and worksheets will be graded on the individual's participation in regard to depth and content of their discussion.

- B. Submit to the department or its curriculum committee the responses to items A1-A5, the current official syllabus of record, along with the instructor developed online version of the syllabus, and the sample lesson. This lesson should clearly demonstrate how the distance education instructional format adequately assists students to meet a course objective(s) using online or distance technology. It should relate to one concrete topic area indicated on the syllabus.

Step Two: Departmental/Dean Approval

Recommendation: Positive (The objectives of this course can be met via distance education)

Negative

Susan P. Schreiner _____
Signature of Department Designee Date

Endorsed: *Mary E. Swenker* _____ *9/21/10*
Signature of College Dean Date

Forward form and supporting materials to Liberal Studies Office for consideration by the University-wide Undergraduate Curriculum Committee. Dual-level courses also require review by the University-wide Graduate Committee for graduate-level section.

Step Three: University-wide Undergraduate Curriculum Committee Approval

Recommendation: Positive (The objectives of this course can be met via distance education)
 Negative

Gail Sedquist Oct. 25, 2010
Signature of Committee Co-Chair Date

Forward form and supporting materials to the Provost within 30 calendar days after received by committee.

Step Four: Provost Approval

Approved as distance education course Rejected as distance education course

Severin [Signature] 10/28/10
Signature of Provost Date

Forward form and supporting materials to Associate Provost.

SYLLABUS OF RECORD

I. Catalog Description

FDNT 150 Foods

Prerequisites: Grade of C or higher in FDNT 151, and
CHEM 101 or CHEM 111

0 class hours
3 lab hours
1 credit
(0c-3l-1cr)

Basic principles of food: composition, sanitation, preparation, and preservation.

II. Course Outcomes

Students will:

- Describe the gross chemical composition (with respect to proteins, fats, carbohydrates, vitamins, minerals, and water) of foods and food systems.
- Explain the relationship between the chemical and physical properties of proteins, fats, carbohydrates, vitamins, minerals, and water in food composition and food systems.
- Describe the principles of preparation used for foods and food products.
- Describe how various preparation techniques affect the composition of foods and food products.
- Explain how various preparation techniques affect the nutritional value of food and food products.
- Describe the basics of food safety.
- Describe the basics of menu planning.
- List and explain the laws and regulatory agencies involved in the control of US food systems

III. Basic Course Outline

- A. Introduction to Food Science (1 hour)
- B. Food Choice and Evaluation (1 hour)
- C. Food Economics and Convenience (1 hour)
- D. Food Regulations and Standards (1 hour)
- E. Food Safety (2 hours)
- F. Food Preparation Overview (1 hour)
- G. Methods of Heat Transfer (1 hour)
- H. Seasonings and Flavorings (1 hour)
- I. Food Composition (4 hours)
- J. Meat (1.5 hours)

- K. Poultry (1.5 hours)**
 - L. Fish and Shellfish (1 hour)**
 - M. Eggs (2 hours)**
 - N. Milk and Milk Products (2 hours)**
 - O. Vegetables (1 hour)**
 - P. Fruits (1 hour)**
 - Q. Salads and Gelatin (1 hour)**
 - R. Sweeteners and Confections (2 hours)**
 - S. Frozen Desserts (1 hour)**
 - T. Cereal Grains and Pasta (1 hour)**
 - U. Starches and Sauces (2 hours)**
 - V. Batters and Doughs (1 hour)**
 - W. Quick Breads and Yeast Breads (1 hour)**
 - X. Cakes, Cookies, and Pastries (1 hour)**
 - Y. Food Preservation (1 hour)**
 - Z. Organic Farming and Biotechnology (2 hours)**
 - AA. Meal Management (2 hours)**
- Four one hour exams (4 hours)**
- Final exam (2 hours)**

**FDNT 150 Foods
Syllabus, Distance Education**

Instructor:	Diane Wagoner, MS, RD, LDN
Office:	Ackerman 103
Phone:	(724) 357-3578
Office Hours:	Posted On Line
E-mail:	dwagoner@iup.edu (FDNT 150 must be in the subject line or email will NOT be read.)
Messages may be left in the Food and Nutrition Department Office, Ackerman 102, 724-357-4440.	

Course materials will be available in Moodle. Please take the time to familiarize yourself with the Moodle Web page and log in procedures. <http://Moodle.iup.edu/Moodle/public/home.pl>

If you are having difficulties please contact the IT Support Center.

<http://www.iup.edu/itsupportcenter>

Phone: 724-357-4000

E-Mail: IT-Support-Center@iup.edu

Walk-in: Suites on Grant Lower - Suite G35

I. COURSE DESCRIPTION

FDNT 150 Foods Lecture

3c.01.3cr

Pre-requisites: Grade of C or higher in FDNT 151, and CHEM 101 or CHEM 111

Basic principles of food, to include: composition, sanitation, preparation, and preservation.

II. COURSE OBJECTIVES

Students will:

- Describe the gross chemical composition (with respect to proteins, fats, carbohydrates, vitamins, minerals, and water) of foods and food systems.
- Explain the relationship between the chemical and physical properties of proteins, fats, carbohydrates, vitamins, minerals, and water in food composition and food systems.
- Describe the principles of preparation used for foods and food products.
- Describe how various preparation techniques affect the composition of foods and food products.
- Explain how various preparation techniques affect the nutritional value of food and food products.
- Describe the basics of food safety.
- Describe the basics of menu planning.
- List and explain the laws and regulatory agencies involved in the control of US food systems.

III. COURSE REQUIREMENTS

Brown, Amy, (2011). *Understanding Nutrition: Principles and Preparation* (4th ed.). Cengage Wadsworth Publishing: Belmont, CA.

ISBN: 978 049 510 7453

Recommended Texts:

- Pennington, J.A., & Douglass, J.S. (2004). *Bowes & Church's food values of portions commonly used* (18th ed.). Lippincott Williams, & Wilkins.
ISBN-13: 9780781744294
- Labensky, S. R. (1998). *Applied math for food service*. Upper Saddle River, NJ: Practicentice Hall.
ISBN-13: 9780138492175

Other:

- Calculator
- Internet access to IUP Moodle course management system
- Microsoft word 2003 or higher (for submitting typewritten assignments)

IV. ADDITIONAL RESOURCES

<http://www.exploratorium.edu/cooking/>

<http://food.oregonstate.edu/learn/index.html>

<http://www.howstuffworks.com>

V. COURSE OUTLINE

Please note: Practice quizzes and Module assignments are due by Sunday at 11:00pm of the week assigned. For example all assignments in Week 1 are due on the Sunday of Week 1; all assignments in Week 2 are due the Sunday of Week 2. All assignments and the quizzes regarding the last module are due by 11:00pm on the LAST DAY of CLASS!

Date	Topics	Text Reading and Assignment	Posting Requirements
Module 1	Food Selection and Evaluation	Chapter 1 <ul style="list-style-type: none"> • Practice Quiz • Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)
	Food Safety	Chapter 4 <ul style="list-style-type: none"> • Practice Quiz • Food Safety Scenario Assignment 	Practice Quiz/Assignment due Sunday of Week (date here)
	Food Regulations and Standards	Chapter 29 <ul style="list-style-type: none"> • Practice Quiz 	Practice Quiz/Assignment due Sunday of Week (date here)
	Exam 1	Chapter 1, 4, 29	Exam Date Here
Module 2	Chemistry of Food Composition	Chapter 3 <ul style="list-style-type: none"> • Practice Quiz 	Practice Quiz/Assignment due Sunday of Week (date here)
	Food Preparation Basics Methods of Heat Transfer Seasonings and Flavorings	Chapter 5 <ul style="list-style-type: none"> • Practice quiz • Heat Transfer Assignment 	Practice Quiz/Assignment due Sunday of Week (date here)
	Exam 2	Chapters 3, 5	Exam Date Here

Module 3	Proteins: Meat Poultry Fish and Shellfish	Chapter 7 Chapter 8 Chapter 9 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)
	Proteins: Milk Cheese Eggs Exam 3	Chapter 10 Chapter 11 Chapter 12 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions Chapters 7-12	Practice Quiz/Assignment due Sunday of Week (date here) Exam Date Here
Module 4	Carbohydrates: Vegetables Legumes	Chapter 13 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)
	Carbohydrates: Fruits and Fruit	Chapter 14 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)
	Soups Salads and Gelatins Exam 4	Chapter 15 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here) Exam Date Here
Module 5	Cereals, Grains and Pastas Flours and Flour Mixtures Starches and Sauces	Chapter 16 Chapter 17 Chapter 18 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)
	Quick Breads Yeast Breads Sweeteners	Chapter 19 Chapter 20 Chapter 21 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)

	Fats and Oils Cakes and Cookies Pies and Pastries Meal Management and Planning	Chapter 22 Chapter 23 Chapter 24 Chapter 6 <ul style="list-style-type: none"> • Practice Quiz • Worksheet or Discussion Questions 	Practice Quiz/Assignment due Sunday of Week (date here)
	Exam 5	Chapters 16-24	Exam Date Here
Comprehensive Final Exam Comprehensive Exam will include material from all chapters.			Exam Date Here per University Wide Final Schedule.

FDNT 150 NCATE Matrix

College Conceptual Framework Standard	INTASC Standard	Discipline Specific Standard/ Program Objective	Course Objective	Course Assessment Measuring Objective*
1a,1e,3c	Principle 1	I.E	1	Quizzes, exams, Comprehensive Final
1a,1e,3c	Principles 1	I.E	2	Quizzes, exams, Comprehensive Final
1a,1e,3c	Principles 1	I.E	3	Quizzes, exams, Comprehensive Final
1a,1e,3c	Principles 1	I.E	4	Quizzes, exams, Comprehensive Final
1a,1e,3c ,4b	Principles 1,8	I.E	5	Quizzes, exams, Comprehensive Final
1a,1e,3c	Principles 1	I.E	6	Quizzes, exams, Comprehensive Final
1a,1e,3c	Principles 1	I.E	7	Quizzes, exams, Comprehensive Final
1a to 1e	Principle 7	I.E	8	Quizzes, exams, Comprehensive Final

*Assignments/products chose for aggregation are bolded

VI. EVALUATION

Course grades will be based on the following:

Practice Quizzes: 200

Exams (includes final): 350 points

Class Participation / Assignments: 100 points

Final Grade Calculation: Your total points divided by total possible points.

A	=	89.5 – 100%
B	=	79.5 – 89.4%
C	=	69.5 – 70.4%
D	=	59.5 – 69.4%
F	=	≤ 59.4%

Note: Quizzes and Exams: All questions will be generated from the readings, assignments, and discussion questions.

Class Participation: Class participation will be based on, but is not limited to: Individual participation in assigned discussion questions/ worksheets.

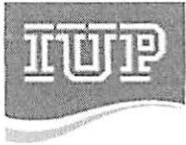
To actively participate, you should read, analyze, and respond to ALL assignments/discussion questions assigned. Your comments should add significantly to the discussion by building on others' comments, suggesting alternative solutions, pointing out problems, and even at times, constructively disagreeing. Try to relate "real world" experiences as much as possible to our activities and discussions. **Remember - go for substance vs. volume.**

Note: The "discussion goal" is to add value to the learning experience not to attack ideas. Tone is very important. A simple remark in the online environment can be easily misconstrued. Review your messages carefully before you post them.

Adequate participation includes at least two substantive responses/comments for each topic assigned.

VII. COURSE POLICIES

1. **All course work must be completed by posted deadlines.** All quizzes and assignments must be completed within the week for that module and are DUE BY Sunday at 11:00pm of the week assigned. **YOU MUST COMPLETE THE QUIZZES IN SEQUENTIAL ORDER by the Sunday of the week assigned.** Late assignments will result in a zero so please pay close attention to the syllabus and weekly assignments. The reading and assignments for each module are listed with the lecture topic. Students **MUST** read the assigned material if you intend to do well.
2. All assignments must be submitted within Moodle. All files need to be uploaded in WORD 2003 or higher.. If another program is used other than WORD, I will not be able to read the document, thus *I cannot grade it, resulting in a zero.*
3. Read e-mail at least one time every day.
4. Incomplete grades will only be awarded to students of record whose work, which so far as it has progressed, is a passing grade, but incomplete due to unforeseen circumstances.
5. Any student caught cheating on an exam or plagiarizing an assignment will receive an "F" for the course and will be processed through the university disciplinary system. Cheating is considered a serious offense by the Department of Food and Nutrition as well as the University and will not be tolerated. Any student who allows another student to cheat off of him/her will also be penalized accordingly.



Indiana University of Pennsylvania

Moodle



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No attempts have been made on this assignment

1. Review the PPT Lecture for Chap 14 *Fruits and Fruit Preparation*.
2. Referring to the attached worksheet *Fruits and Fruit Preparation* please answer all the questions in your own words. You may use your textbook and notes as references. Upload your responses by the due date.

Available from: Monday, 20 September 2010, 03:20 PM

Due date: Monday, 27 September 2010, 03:20 PM

Moodle Docs for this page

You are logged in as Diane Wagoner (Logout)

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Chapter 14 Fruit and Fruit Preparation Worksheet

15 points

Directions: Please answer the following questions using *your own words*. You may use your notes and textbook as references.

1. A fresh fruit salad was made with the following fruits: oranges, bananas, pears, split red seedless grapes, and raspberries. List the order in which the fruits were cut, first to last, and indicate why the fruits were cut up in this order. (4pts)
2. What happens to the quality characteristics of fresh fruit when it is frozen? (1pt)
What are some signs that fruit has been refrozen? (1pt)
3. Explain how fresh fruit should be stored. (1pt)
What happens during storage? (1pt)
What is the scientific reasoning behind the saying that “one rotten apple spoils the barrel”? (1pt)
4. Why are bananas best when stored at room temperature? (1pt)
5. Explain the color changes that happen to fruit during heating. (1pt)
6. Explain the texture changes that happen to fruit during heating. (1pt)
7. Discuss the grading of fresh fruit and how it differs from the grading of canned or frozen fruit. (1pt)
8. List the names for the types of fruit juice beverages in descending order of their fruit juice concentration. (2pt)

Chapter 14: Fruits

Understanding Food:
Principles & Preparation (4th Ed.)
Amy Brown

Objectives

Students will:

- Classify fruits as simple, aggregate, or multiple fruits.
- Describe the composition of fruits.
- Explain how to properly select fresh fruit. List and describe the common food additives in processed fruits.
- List and describe types of processed fruit.
- State the most appropriate preparation methods (dry vs. moist) for specific fruits.
- Explain the physical and chemical changes that occur with fruit preparation.

Fruits

- Nature's desserts
- Available in most every shape & color
- Fruits & seeds from all over the world
- Fruits and Veggies – More Matters campaign
 - Minimum of at least 5 servings of vegetables & fruits
 - 3 vegetables & 2 fruits

Fruits Classification

- Type of fruit is determined by the type of flower
 - Simple – Develop from 1 flower
 - Drupes – Fruit w/ seeds encased in a pit
 - Apricots, cherries, peaches, plums
 - Pomes – Fruit w/ seeds in a central core
 - Apples, pears

Fruits Classification

- Type of fruit is determined by flower type (cont.)
 - Aggregate – Develop from several ovaries in one flower
 - Blackberries, raspberries, strawberries
 - Multiple – Develop from a cluster of several flowers
 - Pineapples, figs

Fruits Classification

- Classification Exceptions
 - Is a tomato a fruit or a vegetable?
 - 1893 US Supreme Court ruled it a vegetable
 - Botanically it is fruit
 - Nuts are fruits
 - Nuts are seeds instead of fleshy fruit
 - Grouped separately
 - Rhubarb
 - Is a vegetable, but treated as a fruit

Fruits Composition

- Cellular Structure & Pigments
 - Similar to vegetables (see Chapter 13)
- Organic acids
 - Volatile & nonvolatile
- Pectic substances
 - Three types – Protopectin, pectin, pectic acid
- Phenolic compounds
 - Also known as tannins

Fruits Composition

- Organic Acids
 - Volatile – Vaporize during heating
 - Nonvolatile – Do not vaporize; leach out when cooked in water
- Common acids...
 - Citric – In citrus fruits & tomatoes
 - Malic – In apples, apricots, cherries, peaches, pears, strawberries
 - Tartaric – In grapes
 - Oxalic – Rhubarb
 - Benzoic – In cranberries

Fruits Composition

- Acidity of Fruits
 - Acids cause most fruits to have a pH value below 5.0
 - Tartness related to acidic content
 - Lemons, limes, cranberries
 - Have lowest pH (2.0)
 - Least acidic fruits
 - More bland & sweet
 - Those with pH above 4.5
 - Most often serve as vegetables

Fruits Composition

TABLE 14-1 Average pH Values for Selected Fruits

pH	Foods
2.2	Lime juice
2.3	Lemon juice
3.1	Apples, boysenberries, grapefruit, prunes
3.2	Rhubarb
3.3	Apricots, blackberries
3.4	Strawberries
3.5	Orange juice, peaches
3.6	Raspberries, red sour cherries
3.7	Blueberries
3.8	Sweet cherries
3.9	Pears
4.0	Grapes
4.2	Tomatoes
4.6	Bananas, eggs
5.1	Cucumbers
5.2	Squash

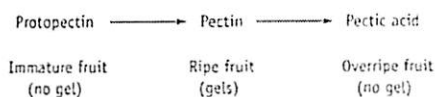
Fruits Composition

- Pectic Substances
 - Polysaccharides found in fruit
 - Cell cement; partially responsible for firmness & structure
 - Protopectin – Large, insoluble molecule in young fruit; enzymes transform into pectin as fruit ripens; doesn't contribute to gelling

Fruits Composition

- Pectic Substances
 - Pectin – Produced at height of ripeness; extracted to make jams & jellies
 - Pectic acid – Produced when fruit is overripe; doesn't contribute to gelling
 - Albedo
 - White, inner rind of citrus fruits
 - Rich in pectin & aromatic oils

Fruits Composition



- Fruit ripens, then becomes overripe
- Pectin becomes pectic acid

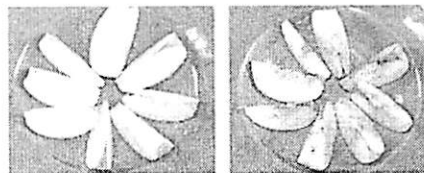
Fruits Composition

- Pectic Substances
 - Food industry uses pectin as...
 - Emulsifier, stabilizer, thickener, texturizer
- Pectic substances & juice cloudiness
 - Pectin substances can cause cloudiness
 - Unappealing in certain juices – e.g., apple juice
 - Clarification process involves adding enzymes, such as pectinases, to break down pectin compounds

Fruits Composition

- Phenolic Compounds
 - Responsible for browning & bruising
- Tannins
 - Found mostly in unripe fruits, giving them a bitter taste and leaving astringent in mouth
- Some fruits that contain phenolic compounds...
 - Apples, apricots, avocados, bananas, cherries, dates, grapes, nectarines, papayas, peaches, persimmons, pears, strawberries

Fruits Composition



Fruits Composition

- Fruits as Functional Foods
 - Fruits important in growth of functional foods
- Some, but not all, are rich in...
 - Vitamins and minerals, and...
 - Antioxidants – E.g., lycopene (linked to reducing cancer risk)
 - Polyphenols – Linked to decreased risk of high blood pressure, heart disease, stroke
 - Fiber – Linked to decreased risk of colon cancer & high blood pressure

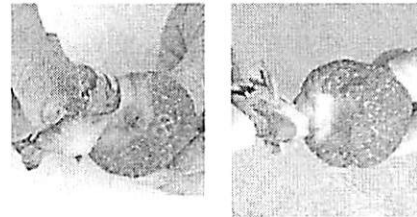
Fruits Composition

- Food Additives in Fruits
 - Additives added dried fruits to prevent browning
 - Sulfites, sorbates, benzoates
 - Some are sensitive to sulfites, so vitamin C can be used instead

Fruits Purchasing

Country	Year	Value	Volume	Value	Volume	Value	Volume	Value	Volume
USA	2007	1000	1000	1000	1000	1000	1000	1000	1000
USA	2008	1000	1000	1000	1000	1000	1000	1000	1000
USA	2009	1000	1000	1000	1000	1000	1000	1000	1000
USA	2010	1000	1000	1000	1000	1000	1000	1000	1000
USA	2011	1000	1000	1000	1000	1000	1000	1000	1000
USA	2012	1000	1000	1000	1000	1000	1000	1000	1000
USA	2013	1000	1000	1000	1000	1000	1000	1000	1000
USA	2014	1000	1000	1000	1000	1000	1000	1000	1000
USA	2015	1000	1000	1000	1000	1000	1000	1000	1000
USA	2016	1000	1000	1000	1000	1000	1000	1000	1000
USA	2017	1000	1000	1000	1000	1000	1000	1000	1000
USA	2018	1000	1000	1000	1000	1000	1000	1000	1000
USA	2019	1000	1000	1000	1000	1000	1000	1000	1000
USA	2020	1000	1000	1000	1000	1000	1000	1000	1000

Fruits Purchasing

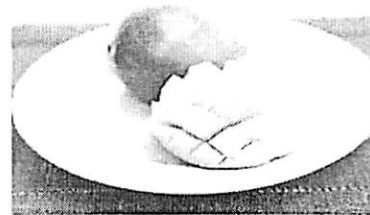


Fruits Purchasing

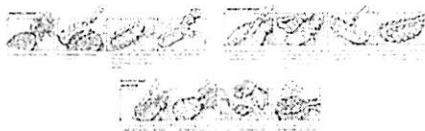
- Dates
 - 2 classes
 - Soft
 - Semi-dry
 - More than 100 varieties
 - Deglet noors = 95% Market



Fruits Purchasing

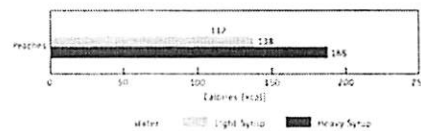


Fruits Purchasing



- Not a single fruit, but rather a cluster of fruits of the Ananas tree
- Above is one approach to cutting a pineapple (for other suggestions refer to p. 327)

Fruits Purchasing



- Processed Fruits – Make fruit available all year by canning, freezing, & drying

**Fruits
Purchasing**

- **Superfruits**
 - Goji & acai – Claims = Increase energy levels, protect the heart from chronic disease, and improve overall well being; evidence inconclusive
 - Blueberry – Rat research suggests that blueberries protect against oxidative stress, reduce learning impairment, boost memory, and possibly partially protect against Alzheimer's disease
 - Cranberry – Prevention and treatment of urinary tract infections

**Fruits
Purchasing**

- **Nutrient Content**
 - **Fat**
 - Fruits are low in fat, except coconuts, avocados, & olives
 - Cholesterol free
 - **Carbohydrates**
 - Main source of calories; carbs converted from starch to sugars during ripening

**Fruits
Purchasing**

- **Nutrient Content**
 - **Vitamins & fiber**
 - Choose a variety of fruits & vegetables to get more vitamins & fiber
 - Removing skin diminishes fiber content; juice contains less fiber than whole fruit

**Fruits
Purchasing**

- **Nutrient Content**
 - **Minerals**
 - Fruits generally low in mineral content; exceptions...
 - Raisins, apricots, avocados, bananas, dates, figs, oranges, plums, prunes, melons
 - **Phytochemicals**
 - Fruits are rich in antioxidants that have health benefits (e.g., reduce risk of heart disease & cancer)

**Fruits
Purchasing**

- **Processed Fruits**
 - Canned as whole, halves, sliced, chunks, crushed, sauce, or juice
 - Fruits canned in their own juice or in light, medium, or heavy syrup
 - **Grading of Canned Fruit**
 - US Grade A or Fancy – Best fruit
 - US Grade B or Choice
 - US Grade C or Standard

**Fruits
Purchasing**

- **Processed Fruits**
 - **Frozen**
 - Retains color & taste, but texture is damaged
 - Signs of refrozen fruit = heavy frost, flaccid, less flavorful

Fruits Purchasing

- **Dried Fruits**
 - Method of preserving fruit that has been used for thousands of years
 - Takes 5 lbs of grapes to make 1lb of raisin
 - Fruit leather
 - Jerky-like strips of fruit
 - Rehydrating dried fruit
 - Add ½ cup liquid per 1 cup dried fruit

Fruits Purchasing

Fruit Juices – Forms...

- Cans
- Cartons
- Bottles
- Fresh
- Frozen concentrates
 - ½ water removed
- Powdered forms
 - May contain added sugar

TABLE 14-5 Fruit Juice Beverage Names Depend on the Percentage of Actual Juice

Beverage Name	Fruit Juice (%)
Juice	Not less than 100
Juice Drink	Not less than 50
Nectar	Not less than 25-40
Adel	Not less than 25
Drink	Not less than 10

Fruits Purchasing

TABLE 14-6 Nutrient Comparison Between Various Fruits and Artificially Flavored and Sweetened Juice

Beverage or Food	Calories	Vitamin A, IU*	Vitamin C, mg†
Apple	77	0	0
Apple (artificially flavored)	150	0	0
Cranberry	65	62.9	21
Cranberry (artificially flavored)	150	0	0
Orange (artificially flavored)	115	2	0
Orange Juice	45	4	122
Orange Juice (artificially flavored)	115	0	0
Juice Drink	70	1	12
Apple Juice	110	40	14
Apple Juice (artificially flavored)	142	22	0
Orange Juice	139	375	65
Apple Juice (artificially flavored)	150	0	0
Orange Juice (artificially flavored)	117	0	21
Orange Juice (artificially flavored)	112	0	11
Apple Juice (artificially flavored)	70	20	20
Orange Juice (artificially flavored)	110	100	15
Orange Juice (artificially flavored)	60	15	65
Orange Juice (artificially flavored)	80	250	0
RJ†			
Artificially Flavored and Sweetened Juice	150	0	0

* IU = International Units
 † mg = milligram

Fruits Purchasing

Fruit Juice Processing

- Juice extraction – Washed; bruises, skin, seeds, mold removed; juice extracted
- Clarification – Varying amounts of pulp eliminated
- Deaeration – Air removed to reduce undesirable changes from oxygen; improves shelf life, maintains flavor, reduces breakdown of vitamin C.
- Pasteurization – High heat inactivates enzymes & destroy microorganisms
- Concentration/additions – Juice percentage varies; ingredients added (e.g., calcium)

Fruits Preparation

- **Enzymatic Browning**
 - Certain fruits susceptible to browning when sliced; inhibiting browning can be done by...
 - Denaturing enzymes
 - Blanching destroys enzymes, but blanching damages texture & flavor
 - Acid pH
 - Acid inhibits polyphenol oxidase enzyme activity. optimal pH is 7.0
 - High acid content of oranges, lemons, & limes works well

Fruits Preparation

- **Enzymatic Browning**
 - Cold temperatures
 - Slows enzyme activity but not complete enzyme inhibition
 - Coating with sugar or water
 - Prevents exposure to oxygen
 - Antioxidant
 - Ascorbic acid (vitamin C) & sulfur compounds use up oxygen

Fruits Preparation

- Changes During Heating
 - Color
 - Heating can change pH and alter color
 - Acids of canned fruits can interact with tin lining to create metal salts that alter color
 - Ethylene gas – Facilitates optimal color in oranges & tomatoes

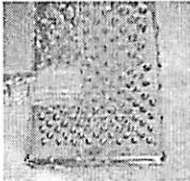
Fruits Preparation

- Changes During Heating
 - Texture – Heating softens fruit due to...
 - Conversion of protopectin to pectin
 - Degradation of cellulose & hemicellulose
 - Denaturation of cell membrane proteins
 - Osmosis – Fruit’s osmotic system of selective permeability is replaced with simple diffusion
 - Flavor
 - Sugars, acids, essential oils, phenolic & aromatic compounds contribute to flavor...
 - These can be lost during heating, which is why fruits are served raw or heated minimally

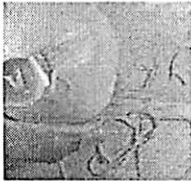
Fruits Preparation

- Changes During Heating
 - Aromatic Oils – Found in the peels of...
 - Oranges, lemons, & limes
 - “Zest” – Colorful outer layer of these citrus fruits
 - Zest often contains more flavor than the fruit’s juice
 - Can be removed via various utensils (e.g., grater, zester tool, knife)

Fruits Preparation



Grater: The smallest holes on a grater can be used to collect zest, which is freed with the use of a pastry brush. Avoid scraping so hard that white pith ends up in the small pores of zest.



Five-hole zester: The shallow blade of a zester does not go any deeper than the zest, making it easy to collect the flavorful and fragrant long strips of zest peelings.

Fruits Preparation

TABLE 14-7 Amount of Zest and Juice Obtained from Citrus

Citrus type	Grated zest, lightly packed	Juice, unstrained
1 lime	1–1½ tsp	about 3 tbsp
1 lemon	½–1 tbsp	½–¾ C
1 orange	about 1 tbsp	about ½ C
1 grapefruit	about 1½ tbsp	about 1 C

Fruits Preparation

- Dry-Heat Preparation
 - Baking
 - Broiling
 - Frying/sautéing
 - Moist-Heat
 - Stewing/poaching
- Dried Fruit
 - Fruit is soaked in water
 - Simmered in covered pan

Fruits Preparation

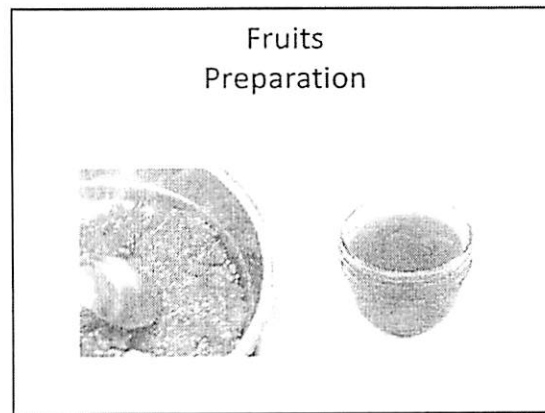
- Fruit Spreads – Types...
 - Fruit preserves
 - Jams
 - Conserves
 - Jellies
 - Marmalades
 - Butters
- Most fruits can be made into spread, expect...
 - Bananas
 - Melons

Fruits Preparation

- Fruit Spread Ingredients
 - Pectin – Makes fruits spreads gel
 - At least 0.5 to 1.0% concentration of pectin to gel
 - Sugar – Natural preservative
 - Most fruit preserves are at least 50% granulated sugar
 - Acid – Contributes to both flavor and gel formation
 - Hydrogen ions help pectin molecules to bind; pH needs to be 2.8 – 3.4
 - Fruit – Some fruits are better for spreads because of varying levels acid & pectin

Fruits Preparation

- Preparing fruit spreads
 - Must have correct ratio between pectin, sugar, & acid; fruit selected determines ratio
 - To prepare...
 1. Heat the fruit
 2. Add sugar and possibly pectin and acid
 3. Pour the mixture into sterile containers
 4. Seal the containers properly



Fruits Preparation

TABLE 14-8 Fruit Pectin and Acid Content		
Adequate Pectin and Acid*	Low in Either Pectin or Acid	Low in Both Pectin and Acid
<ul style="list-style-type: none"> • Apples (sour) • Blackberries (sour) • Cranberries • Eggberries • Currants • Gooseberries • Grapes (Eastern Concord) • Lemons • Loganberries • Plums (not Italian) • Quinces • Red currants 	<ul style="list-style-type: none"> • Apples (ripe) • Blackberries (ripe) • Cherries (sour) • Chokeberries • Elderberries • Grapefruit • Grapes (California) • Logans • Oranges 	<ul style="list-style-type: none"> • Apricots • Blackberries • Figs • Grapes (Western Concord) • Guavas • Peaches • Peas • Plums (Italian) • Raspberries • Strawberries

* Enough natural pectin and acid to permit adequate sugar

Fruits Preparation

TABLE 14-9 Gelling Problems and Their Causes	
Problem	Possible Causes
Sugar is not dissolved Fruit is made in fall	Too much sugar Not enough acid Overcooking Overcooking is prevented by permitting some to stand overnight in cold place to allow mixing in acid jelly
Crystals	Crystals normally occur; may occur in jelly made from variants or containing high acids
Too thick	Too much pectin used Mixture from apples used to make jelly (used pectin in jelly long when cooking)
Failure to gel	Improper balance between pectin, sugar, and acid Lack of pectin and fruit Overcooking
Firm to jelly or weak formation	Jelly glassed and will set (not jelly) or does not set; being glassed jelly not completely gelled

Fruits Storage

- Many Fruits
 - Picked & shipped in unripe state
 - Transportation damages delicate fruits
 - Unripe fruit
 - Left at room temperature in paper bag until ripe

TABLE 14-10 Selected Climacteric and Non-climacteric Fruits

Climacteric Fruits (Temperature to ripen after harvest)	Non-climacteric Fruits/vegetables (Temperature to store harvest)
Apple	Asparagus
Apricot	Broccoli
Avocado	Cauliflower
Banana	Corn
Broccoli	Cucumber
Carrot	Custard apple
Cauliflower	Fig
Corn	Ginger
Cucumber	Kidney beans
Fig	Leek
Ginger	Onion
Kidney beans	Potato
Leek	Spinach
Onion	Tomato
Potato	
Spinach	
Tomato	

Fruits Storage

- Fresh Fruit
 - Ripe fruit w/ high water content ...
 - Consume within 3 days of purchase
 - Once ripe, increase storage time by...
 - Placing in plastic bags w/ air holes
 - Refrigerate

Fruits Storage

- Canned Fruit
 - Keep quality longer
 - Store in dry place
 - Temperatures < 70°F (21°C)
 - Discard if cans are...
 - Bulging, dented, leaking, rusted

Chapter 14 Fruit Practice Quiz

10 questions will be randomly selected each time the student takes the quiz. The practice quiz may be taken two times. Students will be encouraged to study the material before they take the quiz. The highest of the two scores will contribute to their total points.

Multiple Choice

- _____ 1. Fruits are
 - a. aggregates of blossoms that form seeds.
 - b. any part of an edible plant.
 - c. ripened nuts and seeds of plants.
 - d. ripened ovaries and adjacent parts of a plant's flowers.
 - e. edible plants or parts of plants eaten as desserts.

- _____ 2. Which fruit classification contains drupes and pomes?
 - a. simple
 - b. aggregate
 - c. multiple
 - d. several ovaries in one flower

- _____ 3. There are several fruits that fit into the classic botanical definition of "fruits" but are used in meal patterns as vegetables because they are NOT
 - a. acidic.
 - b. acerbic.
 - c. sweet.
 - d. flavorful.
 - e. fragrant.

- _____ 4. Which of the following is really a vegetable but treated like a fruit?
 - a. nuts
 - b. rhubarb
 - c. squash and okra
 - d. green beans and cucumbers

- _____ 5. Fruits are very similar in cell structure and pigment composition to
 - a. legumes.
 - b. vegetables that grow above ground.
 - c. vegetables with a high starch content.
 - d. vegetables.
 - e. cereal grains.

- _____ 6. All of the following substances are found in fruits except
 - a. nutrient acids.
 - b. organic acids.
 - c. pectic substances.
 - d. phenolic compounds.

- _____ 7. Organic acids contribute
- acerbic flavors in fruits.
 - sweet flavor components in fruits.
 - tart flavor components in fruits.
 - volatile taste components in fruits.
- _____ 8. The natural sugars listed below are largely responsible for the sweetness of fruits with the EXCEPTION of
- fructose.
 - glucose.
 - maltose.
 - sucrose.
- _____ 9. Acid content varies with the maturity of the plant, the acid content of
- the mature plant being equal to the youngest fruit.
 - the plant increasing with maturity.
 - the plant decreasing with maturity.
 - some plants increasing and some decreasing with maturity.
- _____ 10. Most fruits have a pH value
- below 3.0.
 - below 5.0.
 - between 5.0 and 6.0.
 - above 6.0.
- _____ 11. Pectin is the
- cementing compound between the cell walls of the fruit.
 - coloring compound found within the cells of fruit.
 - flavoring compound found between the cells of the fruit.
 - taste compound found under the skin of fruit.
 - primary organic acid found in the skin of fruit.
- _____ 12. Which compound(s), in conjunction with sugar, contributes to the gelling characteristics of fruit preserves?
- phenolic compounds
 - protopectins
 - pectin
 - pectinic acid
 - pigments
- _____ 13. Many processed foods benefit from pectin's ability to
- improve texture of frozen foods by controlling ice crystal size.
 - prevent loss of syrup during thawing of frozen foods.
 - evenly distribute added substances that would normally sink to the bottom.
 - increase viscosity of liquids.
 - all of the above answers are correct
 - none of the above answers is correct
- _____ 14. Which of the following enzymes do juice processors sometimes add to increase juice extraction?
- pectinases
 - phenolase and catecholase
 - tyrosinase
 - cellulase and hemicellulase

15. Phenolic compounds
- are also known as tannins.
 - are found predominately in ripe fruits.
 - provide the sweet flavor found in ripe fruits.
 - prevent enzymatic browning by an enzyme called polyphenol oxidase.
- ___ 16. The three compounds that are responsible for the browning in fruits when they are cut include all of the following EXCEPT
- polyphenol oxidase enzymes.
 - nitrogen.
 - oxygen.
 - phenolic compounds.
- ___ 17. Enzymatic browning in fruit is catalyzed by
- melanins.
 - polyphenol oxidase.
 - cellulase and hemicellulase.
 - all of the above answers are correct
 - none of the above answers is correct
- ___ 18. ___ content is reduced if fruit is exposed to air by bruising or cutting, or to alkali or copper, or through cooking or processing.
- Glucose and fructose
 - Diphenylisatin
 - Soluble fiber
 - Vitamin C
 - Iron and potassium
- ___ 19. ___ is an antifungal agent that aids in the preservation of various foods.
- Sorbic acid
 - Benzoic acid
 - Potassium bisulfite
 - Sodium sulfite
- ___ 20. According to the *Code of Federal Regulations*, fruit cocktail may be canned in
- its own juice (with only 2 to 6 percent sugar added).
 - light syrup (some sugar added, 10 to 14 percent density).
 - heavy syrup (25 percent density).
 - all of the above answers are correct
- ___ 21. Freezing fruit decreases the quality of the fruit's
- taste.
 - color.
 - texture.
 - nutrients.
- ___ 22. Which of the following statements about freezing is false?
- Freezing ruptures cell membranes as the ice crystals expand.
 - Packages or bags that have a heavy frost clinging to the outside should not be purchased because this is a sign of thawing and refreezing.
 - Refrozen fruit is flaccid and less flavorful.
 - A temperature of 32 degrees F should be maintained at all times during storage and transport.

- _____ 23. Most fruits are about _____ percent water.
- 50
 - 75
 - 85
 - 95
- _____ 24. It takes about _____ pound(s) of grapes to produce 1 pound of raisins.
- 1
 - 2
 - 3
 - 5
 - 7
- _____ 25. The process of drying fruit
- decreases the fruit's resistance to microbial spoilage.
 - increases the volatile substances in the fruit.
 - firms the cellulose of the fruit.
 - sweetens the fruit's taste.
 - all of the above answers are correct
 - none of the above answers is correct
- _____ 26. A beverage labeled "tropical juice drink" should contain a minimum of _____ percent actual juice.
- 10
 - 25
 - 50
 - 75
 - 100
 - all of the above answers are correct
- _____ 27. Regarding tomato juice, which of the following statements is correct?
- The suspended pulp contributes to viscosity.
 - If left standing, pectin methyl esterase breaks down the pectin, resulting in a less viscous juice over time.
 - The hot-break process inactivates the enzymes.
 - Allowing enzyme activity to occur and produce a tomato juice with a thin viscosity is called the cold-break process.
 - all of the above answers are correct
 - none of the above answers is correct
- _____ 28. Deaeration
- decreases shelf life.
 - increases flavor.
 - reduces the oxidation of vitamin C.
 - all of the above answers are correct
- _____ 29. The process of pasteurizing juice
- inactivates enzymes and destroys microorganisms that can cause foodborne illness.
 - allows the particles of fruit to stay suspended in the juice without settling to the bottom.
 - increases the fresh-squeezed flavor.
 - all of the above answers are correct

- ___ 30. Which of the following statements is correct regarding enzymes and haze?
- Cellulase is added to juices to hydrolyze the pectin.
 - Pectinase is added to juices to hydrolyze the cellulose.
 - Glucose polymers are added to juices to reduce haze.
 - Amylase enzymes are added to eliminate haze caused by glucose polymers.
- ___ 31. Enzymatic browning in fruits can be slowed down or inhibited by
- refrigeration.
 - coating with a cream of tartar solution.
 - coating fruits with sugar or submerging in water.
 - dipping fruit in ascorbic acid or sulfur solutions.
 - all of the above answers are correct
- ___ 32. Why are some raisins brown-colored and some raisins golden-colored?
- Dark-colored raisins are darker because of heat treatment, which changes the pH of the fruit, thus darkening it.
 - Dark-colored raisins are treated with metal salts.
 - Light-colored raisins are often treated with sulfur dioxide, which prevents enzymatic browning.
 - Light-colored raisins are treated with ethylene gas to facilitate ripening.
- ___ 33. Ethylene gas
- allows fruits to deteriorate more quickly.
 - slows down the ripening process.
 - reduces respiration.
 - all of the above answers are correct

Matching

Definition choices:

- thick and smooth fruit preserves made from long-cooked fruit which is sieved
- a mixture of fruits with added nuts and raisins but no sugar
- made from juice of cooked fruit with added sugar and pectin; may be clear if the juice is strained first
- a preserved fruit product made from ground or mashed whole cooked fruit
- a preserved fruit product made from the juice with thin pieces of fruit and rind

- ___ 1. butters
- ___ 2. conserve
- ___ 3. jam
- ___ 4. marmalade
- ___ 5. jelly