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Development of Devices Which Might Be Used in the Classifcation of Freshman Students in Foods Classes

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DEVELOPMENT OF DEVICES WHICH MIGHT BE USED IN THE CLASSIFICATION OF FRESHMAN STUDENTS IN FOODS CLASSES.

A Problem

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3. To perfect the device by careful analysis and comparison of the tests as a whole and each individual part for reliability, validity and objectivity.

REVIEW OF THE LITERATURE

One of the essential factors to consider in the success and improvement of any program in home economics is a comprehensive plan for evaluation. Evaluation has been defined as the process of judging the effectiveness of educational experiences. Broadly interpreted, this means the appraisal of many aspects of learning. This should mean not only the acquisition of knowledge, skills, and information, but also the changes in attitudes, values, appreciations and understandings which a person has acquired during the learning process because these latter affect one's daily living more than mere knowledge or skills. True evaluation will try to answer not only the questions of "how much" but also questions of "what quality" and "of what value" is the learning.[1]

There is a paucity of standardized tests for measuring any phase of the areas in home economics. Perhaps one of the reasons for such scarcity is the diversity of subject matter covered while another is continuing development in the field of research. Achievement of desired goals in foods classes is influenced by several factors such as the physical setup of the laboratory, the kinds of experiences provided in the classroom situation, the interest which the pupils have in improving their own skills and understandings, the experiences which they bring to the class from their own background of home living, and the length of the class periods allowed for the laboratory classes. In a study carried on by Price[2] in determining

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[1]Dirks, Marie, "Evaluation in Home Economics," The Bulletin of the National Association of Secondary-School Principals, vol. 37:50-61, October, 1953.

[2]Price, Hazel H., "Relative Accomplishment of Ninth- and Tenth-Grade Food Classes," Educational Research Bulletin, vol. 31:225-30, December 10, 1952.

Ashmore[5] found that high school records predicted the first year college average better than the first semester college averages predicted the second semester averages; and that the two factors of intelligence and English mastery predicted college scholarship better than any other subject group.

Livingston's study[6] to determine whether success in high school homemaking tended to carry over into success in college home economics during the freshman year indicated that students taking one or three years of high school homemaking did better in their college home economics classes than did those taking high school homemaking for two years. She concluded that the selection of students in college home economics might well be based upon high school achievement in general, rather than upon how well they did in homemaking in high school.

Scholtes[7] approached the problems of predicting achievement and placement of students in college clothing classes by the use of a battery of tests involving finger dexterity in place of the Saddler Clothing Test. The study indicated that there was a close relationship between sewing achievement and experiences involving the use of the fingers.

As yet no test or battery of tests seems to be available for general use in predicting achievement in foods classes at the college level. The field appears to be open for research as there is a need for such instruments.

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[5]Ashmore, Ben, "High School Teacher's Marks as Indicators of College Success," Journal of American Association of Collegiate Registrars, vol. 21: 219-30, January, 1946.

[6]Livingston, Grace, "A Comparison between High School Achievement and Certain Achievement in First Year of College," an unpublished M.S. thesis, Colorado Agricultural and Mechanical College, Fort Collins, 1952.

[7]Scholtes, Mary Cleta, "Selection of a Test Battery for the Prediction of College Clothing Construction Achievement," an unpublished M.S. thesis, Iowa State College, Ames, 1948.

REASONS FOR THE STUDY

In order to understand and appreciate the total individual in the modern schoolroom situation, a teacher must have means of more adequately evaluating that student's progress in many phases of the educational program. Emphasis heretofore has been placed upon the acquisition of knowledge. Today educators are concerned not only with the students acquiring knowledge but also, and to a much greater degree, with how this information helps the student to understand himself and how it changes his behavior and helps him to adjust to living in a democratic society. In homemaking education, as well as in other fields, teachers at both the secondary and the college levels are interested in learning at what developmental stage a student is and how best to help that person to grow and progress beyond his present level. In order to more effectively help a student, educators need devices and techniques to measure and then to evaluate this knowledge. With this information, a teacher may build on what the students already know.

Information which one may have at one's command is of little or no value unless it will be used to change one's behavior pattern or to concur with one's way of doing work. Consequently, an evaluation device must give a student the opportunity to express himself in different ways so that a composite picture may be secured. For this reason, devices for testing should cover broad areas of pupil activity within a limited field.

Sometimes a student rapidly learns certain information from a book, but to make application to a practical problem may be difficult. A testing device should help the teacher to more accurately see the placement of a student in a group, and it should help her to determine what phases of pupil

activity or learning need special attention or additional practice.

At present there is a dearth of such testing and evaluating devices in homemaking education; so the purpose of these tests is to attempt to measure the learnings acquired in phases of food preparation, whether those learnings were secured in a formal classroom situation, in the home kitchen, or while the student was doing work for money. Not only do the devices attempt to measure the acquisition of information but they also attempt to see how far a student has applied this information, as illustrated by her attitudes toward certain food preparation procedures and by her practices in such activities.

Paper and pencil tests are the one means of testing that are most commonly used. However, the real test of a student's knowledge is in its application to a life situation. Therefore, no battery of tests would be complete without some device for checking skills involved in preparing a simple meal. An attempt was made to evaluate such intangible skills as management of time, supplies and equipment, and in the service of the meal. It is hoped that these testing devices may be used successfully for classification of students for freshman foods classes in home economics.

Teachers of homemaking at the secondary level are often concerned about the fact that pupils who plan to prepare for a career in home economics by going to college do not take all the homemaking courses offered in the high school curriculum. The reason frequently voiced is that there is little use of doing so because first year college courses are just a repetition of the same information which they have learned in high school. This should not be the case. If a pupil really understands the principles involved in a

procedure and can make application under varying conditions she should not have to repeat such learning. However, some students think that they have certain understandings just because they at some time have been exposed to them in a high school class, and in reality they know very little. For this reason these testing devices should be such that an individual student can see for herself where her knowledge is lacking. With this information she should not object to being required to take certain elementary courses in foods work, even though she previously felt that she had the information.

The purposes of the devices are two-fold: first, because of an awareness of the need for more information on the preparation and experience which students bring to their classes, it is hoped that the use of the devices may be effective in classifying first-year college students in food preparation classes. The information secured from the devices may be helpful in planning the college curriculum so that students may be challenged and stimulated to greater effort and learning. Secondly, it is hoped that the devices may serve as an incentive to high school pupils interested in majoring in home economics in college to take, in high school, as many years of homemaking as the curriculum offers, so that they may have an adequate background for the college courses which they will take later.

METHOD OF PROCEDURE

A. Preliminary Planning and Selection of Test Content:

In order to develop a test which might be used for purposes of classification of students in first-year college foods classes, it was necessary to have some criteria for judging the background of information which a student possessed. Therefore, a careful examination of courses of study and curriculum guides of South Dakota and surrounding states was made. Much similarity of subject matter taught was found which indicated that most pupils who have taken one year of high school homemaking should have been exposed to the principles and skills involved in preparing simple breakfasts and luncheons. Those taking two years of homemaking at the high school level had studied and had had some practice in food preservation and conservation and in planning and preparing luncheons and simple dinners. By the end of the second year students also would have had some study of the principles of family nutrition. Third year homemaking seemed to involve greater managerial ability in preparing foods for larger meals and in larger quantities than for simple family meals. At this level high school pupils had also had more application of nutrition principles in planning family menus. Some work was indicated in the problem of cooking for two, in preparing food for the sick and convalescent, and in entertaining.

With this information as a basis, the next step preliminary to the actual development of the device was to check the texts and reference material commonly used by the high schools to see how this information was presented and developed. After comparing those books most often found in high schools, the devices testing application of principles and definition of terms were

tentatively developed. After developing these instruments, they were given to homemaking teachers attending the 1953 summer session at South Dakota State College to examine and check for adequacy of coverage. It was felt that teachers returning for graduate courses would possess a professional outlook in their evaluation of the devices. The opinion of these teachers was that the test covered the curriculum involved in all high school classes, but they wondered if high school graduates had grasped the many applications of principles involved in such a variety of situations. However, it was felt that a pupil who had taken high school homemaking and had considerable practical experience should be challenged with a somewhat broader view of the field of foods work in college and that the test should indicate to her more of the scope and depth of the field as presented at the college level. For this reason, although the homemaking teachers considered some of the material too advanced and difficult and beyond high school comprehension, many of the items in the application of principles test were allowed to remain.

Before actually constructing the tests and check lists, it was decided that such an instrument should be broad enough in scope to get pupil reactions on many phases of foods work. Consequently, a section was devoted to each of the following: attitudes toward food preparation, practices involved in foods work, knowledge of principles involved in food preparation, definitions of terms used in foods work, and practical application in the actual preparation and serving of a simple meal to test and observe management of time, energy and supplies.

The typical paper and pencil test has little value in measuring habits, attitudes and feelings.[1] Likewise, they do not adequately measure skills needed in the actual preparation of food. Nevertheless, these items are frequently determining factors in the success of the student. As a result, a check list was attempted to allow a student to express how she felt about certain procedures and processes concerned with the preparation of food for the family, what practices she tended to follow, and to what degree she had participated in food preparation activities.

It was hoped that by using a variety of devices a more complete picture of a student could be secured and, at the same time, the student in college for the first time might realize that foods work is not just concerned with the "cooking" angle, but that it is concerned with many other phases and aspects of the subject. For example, she might learn that while preparing food for a meal, a person must cooperate with others and learn to assume her fair share of responsibility if the meal is to be a success. The actual act of working with another may be a more vital experience than the actual preparation of a specific dish for a meal, because it involves social relationships -- learning to get along with others.

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[1] Arny, C. B., Evaluation in Home Economics. New York: Appleton-Century-Crofts, Inc., 1953, p. 6.

B. Formulating Tests and Check Lists and Delimitation of the Problem:

Because the area of foods covers such a wide realm of material, several different types of devices were needed to truly appraise the background of information which an incoming student possessed. Knowledge of terms, procedures and methods used in food preparation is one thing, but the application of such learnings to the actual situation often is quite a different problem. For this reason it was felt that varied devices might present the problem in different lights and a truer picture of the student would be secured. Likewise, it might be possible for students and teachers together to develop and clarify a set of worthwhile workable goals for a course in foods in college. Arny states:

> "Slowly but surely, there is emerging a realization that both instruction and evaluation should be focused upon goals, rather than upon content; upon the use people will make of subject matter rather than upon the subject matter itself. If one really accepts this belief and attempts to apply it in the classroom, considerable modification of the curriculum and the methods of teaching and evaluation may be required."[2]

In developing the test on application of principles, a principle was applied in several different situations. For example, the fact that starch may be used as a thickening agent depends upon the principle that the thickening action is due to the ability of starch granules to swell to many times their size in hot water; this swelling is called gelatinization.[3] This principle was utilized in questions 1, 42, 43, 51 and 58 (See Appendix, pp. 58-62). Thus the test gave the student several opportunities to detect application

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[2] Ibid., p. 13.

[3] Fitch, N. F. and Francis, C. A., Foods and Principles of Cookery, New York, Prentice-Hall, Inc., 1948, p. 45.

of a commonly known and used fact each time in a statement of greater difficulty.

Another example was the question of protein cookery and problems involved in preparing foods with high protein content. Statements concerning reasons for the scorching of milk #2, temperatures for meat #10, cooking custards #15, cheese cookery #29, baking sponge cakes #37, making souffle #40 and preparing less tender cuts of meat #44 all utilized the same principle that in the preparation of foods with high protein content low temperatures should be maintained.[4] All principles used in this section of the test were those which could be applied to foods which were studied at the high school level.

In the section devoted to the definition of terms used in food preparation, only terms found in high school texts which were published since 1949 were included. For reasons of accuracy these terms were checked against the Handbook of Food Preparation, published by the American Home Economics Association in 1950.

In order to increase the reliability of the test, specific and detailed directions preceeded each section with an example of what type of response was desired. Since the controlled true-false statements tended to be a relatively new type of question for many students, important words were underscored in the instructions for this section of application of principles, so that the key part of the directions would not be overlooked or missed entirely.[5]

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[4] Ibid., pp, 150, 206-9, 186, 171.

[5] Arny, C. B., Evaluation in Home Economics, op. cit., p. 103.

For all sections of the test enough time was allowed for even the poorest student to complete the test. However, in no case was more than one hour used for any one section of the test.

In formulating the attitudes check list, situations were used which represent the type of activity many students do in the home. A few situations involving greater understanding of an activity were included to get a more complete view of the student's attitude toward homemaking activities. For example, the eleventh and twelfth items which involved an analysis of some motion study in food preparation would indicate a more thorough understanding of an activity and an analytical attitude on the part of the student.

The practices check list helped the student to indicate in what activities in food preparation she had participated and to what extent the responsibility for this participation was hers.

In order to use these techniques for classifying purposes, it was felt that a practical device be used for any student or students who ranked high in all sections. Its purpose was to determine if the student possessed not only the knowledge of terms and principles but also if she could apply this information in managing her time, supplies, utensils, equipment and energies in the actual preparation and service of a simple meal.

With the preparation of these tests and the actual use of the first four sections, the author realized that the problem must be delimited. Consequently, this problem has been narrowed to the perfecting and refining of the two sections which attempted to measure the extent of knowledge of principles involved in food preparation and in the definition of terms used in food preparation.

C. Analysis of Tests:

After the sections of the tests dealing primarily with information were analyzed, edited and assembled, the tests were given to two homemaking teachers in the state. These teachers had been previously contacted as they had been recommended by the college and the state supervisor of homemaking education as being superior teachers who would likely cooperate with the project. These teachers agreed to give the tests to pupils enrolled in Homemaking III some time during the early part of the second semester. The author did the same in her class. It was felt that such pupils would most nearly correspond with the college freshman group for background of information. Those high school pupils taking the Application of Principles and Definition of Terms tests totaled fifty-six and fifty-five, respectively. These test papers, taken by high school pupils, were used in conjunction with those secured from the college freshman classes for purposes of analysis.

At the college level the Application of Principles test was given to all freshman students enrolled in the home economics division prior to their assignment to sections; there were sixty-six students in this group. The Definition of Terms test was given only to those students who had elected to take the first foods course during the spring term of 1954. This group was somewhat smaller and numbered forty-seven students. As a result, there was a difference in total number of responses considered in the two sections of the test with one hundred twenty-two persons in the Application of Principles group and one hundred two in the Definitions of Terms test. Arny[6] had found that 100 cases were adequate for the purposes of test analysis, and it was felt that sufficient cases were provided in this study to analyze the two tests.

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[6] Ibid., p. 326.

Sectional analysis of tests for difficulty:

Since the object of these tests was to be able to use them as a means of classification of students into sections for foods classes, the test would be considered a type of mastery test -- one which separates those who know basic material from those who do not.[7] For this reason it was felt that some questions should remain in the final edition of the test even though a high percentage of students taking the test failed to give the right answers.

Table I.

PERCENTAGE OF DIFFICULTY OF TESTS ON APPLICATION OF PRINCIPLES AND DEFINITION OF TERMS USED IN FOOD PREPARATION ON THE BASIS OF TYPES OF QUESTIONS.

Type of question	Total errors in section	Possible errors in section	Percentage of errors
Application of principles used in food preparation			
Controlled, true-false	1174	1984	59.3
Multiple-choice	974	1736	56.1
Matching (1)*	216	620	34.8
Matching (2)*	418	1240	33.5
Matching (3)*	229	558	41.0
Total	3011	6138	Average 49.0
Definition of terms used in food preparation			
Matching (1)**	185	486	38.0
Matching (2)**	228	486	46.9
Matching (3)**	150	540	27.7
Matching (4)**	233	486	47.9
Matching (5)**	454	918	49.3
Recall	274	594	46.1
Matching (6)**	157	540	29.1
Total	1681	4050	Average 41.5

(1)* Principles involved in preservation of food. (2)* Principles involved in freezing and canning food. (3)* Principles involved in planning a meal. (1)** Foods or substances used in food preparation. (2)** Uses of eggs in cooking. (3)** Processes in food preparation. (4)** Methods of cookery. (5)** Common measurements in cooking. (6)** Setting the table.

[7] Ibid., p. 318.

When the analysis of the controlled-true-false questions was made, it was discovered that an error had been made in the physical setup of the test which resulted in serious error in the correcting and scoring of the section. Since the student was instructed to indicate not only if the statement was true or false but also to change the word or phrase which made it false, in case it was a false statement, each item should have received two points in scoring in place of one. As a result of this mistake the percentage of error was very high. In several cases a student recognized that the statement was false but did not know how to correct it and received no credit for the recognition of the false statement. This error has been corrected in the revised edition of the test.

Another reason for the high percentage of error may have been that the students were not familiar with the type of question and the mind-set stayed with the traditional true-false type. A third factor, no doubt, was the fact that the subject matter covered in this section required that the knowledge of fundamental principles of food preparation and nutrition be applied to specific situations. This is always more difficult than recognizing a correct answer in a matching section. Another factor may have been the terminology used in the statements. Students entering or ready to enter college were not familiar with the technical terms used in some statements and this factor may have confused them.

When the percentage of error of the sections was analyzed as seen in Table I, the controlled-true-false and the multiple-choice statements showed from 59 percent to 56 percent difficulty. Ross says: "The rule suggested for construction of tests to discriminate best among all members of a group is to

to make every item of 50% difficulty as far as possible."[8] When the percentage of total errors made in the test was computed for the Application of Principles test there was found to be 49 percent of error. This closely approximates the suggestion by Ross above.

From Table I it may be concluded that the test over the Definition of Terms with a percentage of 41.5 was less difficult than the first test. This would indicate that the subject matter covered by this section was more within the grasp of the students. Another contributing factor may have been the similarity of type of questions found in the test.

Item analysis of tests for difficulty:

In order to arrange the items of a test in the order of difficulty, it was necessary to determine the difficulty of each item. It is generally agreed that the first items in any section of a test should be easy; perhaps so easy that nearly everyone taking the test will get the first one or two items correct. By including at least one such simple item, the confidence of the student is built up; whereas, if very difficult items are placed first, the student may immediately become discouraged and fail to make as good a score as he would otherwise have been able to do.

For establishing the difficulty of each item the author used the following procedure:

1. One hundred twenty-two Applications of Principles and one hundred two Definition of Terms tests were checked by marking only errors or omissions.

2. After all papers were scored, they were arranged in order of scores with the fewest errors on top and the most errors at the

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[8] Ross, C. C., revised by J. C. Stanley, Measurement in Today's Schools, New York: Prentice-Hall, Inc., 1954, p. 119.

bottom. Twenty-seven percent of the top papers were placed in one group, hereafter called the W_H group. Twenty-seven percent of those who scored losest in the test were set aside in the W_L group.[9a] Some authorities recomment using the upper and lower one-fourth of the group. Others suggest the upper and lower one-third. The author used the percentage recommended by Julian C. Stanley.[10a] In the case of the Application of Principles test where 122 pupils took the test, the low and high groups each contained thirty-one papers. This was determined by multiplying 122 x .27 = 32.9. But at the thirty-third paper from the top there were five papers, so instead of increasing the number to thirty-eight papers, the author found that at the thirty-one paper level in both groups there was a natural break, and for that reason used thirty-one papers in both the high and low groups. This left a middle group of sixty papers. They were put aside for they were not needed for this analysis.

3. Starting with Item 1 in each test, the papers were checked to determine the number of errors made on each item in both the high and the low groups. In Table II, the errors per item for each group are listed. Then by adding the number of errors per item in the high and low groups and dividing by the possible number of errors on the item, the percentage of difficulty for each item was established. Since this test was the mastery type, four out of the seventy-six items in the Definition of Terms test and sixteen out of the ninety-nine items in the Application of Principles test were allowed to remain with only revision of wording for purposes of clarification

4. The items were then arranged in order of difficulty and each item with sixty to one hundred percent of difficulty was carefully analyzed to determine why it was such a difficult item. In the case of number 3* in the original Application of Principles test which read:

9a Ibid., p. 118.

10a Ibid., p. 118

*See Appendix, p. 59

Table II

ANALYSIS OF ERRORS MADE BY HIGH (W_H) AND LOW (W_L) GROUPS OF STUDENTS TO DETERMINE THE PERCENTAGE OF DIFFICULTY OF ITEMS IN APPLICATION OF PRINCIPLES INVOLVED IN FOOD PREPARATION.

Item number	Number of errors W_L*	W_H*	Total errors $W_L + W_H$	Percentage of difficulty
2	3	2	5	8
24	4	3	7	11
30	9	0	9	15
8	8	3	11	18
25	9	3	12	19
22	10	3	13	21
17	12	6	18	29
13	14	5	19	31
12	10	10	20	32
32	13	7	20	32
9	13	8	21	34
20	15	11	26	42
27	15	14	29	47
31	17	14	31	50
6	21	16	37	60
4	24	14	38	61
29	22	18	40	65
26	28	18	46	74
11	27	23	50	81
28	26	25	51	82
3	29	22	51	82
18	29	22	51	82
23	29	25	54	87
10	27	27	54	87
7	31	24	55	89
15	27	29	56	90
14	28	28	56	90
5	31	25	56	90
21	30	26	56	90
19	30	29	59	95
16	30	31	61	98
1	31	31	62	100

* W_L = 31 students in the lower 27%.
* W_H = 31 students in the upper 27%.

Table II (continued)

Item number	Number of errors W_L	Number of errors W_H	Total errors $W_L + W_H$	Percentage of difficulty
48	4	1	5	8
57	10	1	11	18
37	12	6	18	29
53	10	8	18	29
46	16	7	23	37
58	16	8	24	39
52	17	9	26	42
44	16	11	27	44
36	21	8	29	47
33	22	9	31	50
51	16	18	34	55
55	20	14	34	55
49	20	16	36	58
45	25	21	36	58
60	23	14	37	60
59	25	12	37	60
42	20	18	38	61
34	26	13	39	63
50	22	20	42	68
40	26	16	42	68
56	23	21	44	71
39	25	19	44	71
54	24	21	45	73
43	24	22	46	74
47	25	24	49	79
35	27	22	49	79
38	26	24	50	81
41	27	23	50	81
70	8	1	9	15
65	13	2	15	24
62	14	1	15	24
64	15	4	19	30
61	13	8	21	34
66	16	5	21	34
67	19	2	21	34
68	17	6	23	37
63	23	12	35	56
69	21	16	37	60

Table II (concluded)

Item Number	Number of errors W_L	Number of errors W_H	Total errors $W_L + W_H$	Percentage of difficulty
82	5	0	5	8
87	6	0	6	10
88	10	3	13	21
72	12	3	15	24
90	13	2	15	24
78	14	1	15	24
75	13	7	20	32
71	16	4	20	32
77	15	6	21	34
84	16	5	21	34
83	16	5	21	34
73	16	5	21	34
74	17	4	21	34
79	16	6	22	35
81	18	4	22	35
89	20	3	23	37
85	20	8	28	45
80	19	9	28	45
86	26	11	37	60
76	23	21	44	71
96	8	2	10	16
93	12	0	12	19
97	12	3	15	25
94	20	4	24	39
91	18	7	25	40
95	18	12	30	49
99	21	13	34	55
92	23	13	36	58
98	21	22	43	70

"The gluten of pastry flour is more elastic and will hold more water than other flours." The statement is being changed to read: "The gluten of cake flour is more elastic and will hold more liquid than other flours." These changes were made because the modern terminology is "cake" flour rather than "pastry" flour, and the term "liquid" is more inclusive than "water." The brighter, more intelligent student may have thought that few cakes call for water but use other liquid ingredients, and the term "pastry" was ambiguous.

In item number 14* which read "Fruits loose (sic.) as much vitamin content by cooking as do vegetables," the statement was changed by the insertion of "because of their acidity" to read "Fruits, because of their acidity, lose as much vitamin content by cooking as do vegetables." The higher group will find more reason to apply the principles of nutrition and cookery to such a statement.

Although the percentage of difficulty of the last ten items was above 85 percent, they were allowed to remain as a challenge to the students by portraying the breadth of the subject. In a mastery test there may be some items which no one checks correct. In this last group of questions the terminology was more technical and exacting. Item number 32*, for example, was missed by every student taking the test, which gave it a 100 per cent difficulty rating.

In the multiple-choice section, the first item was allowed to remain as an easy item to start the section. In no case did a percentage of difficulty reach the 85-100 percent level. Correction in wording for clarification purposes was made on several items, but no major alterations were made on this section.

*See Appendix, p. 59.

Ross[9] says that in constructing a test the ideal would be to have every item approximate 50 percent difficulty if it is to discriminate best among all the members of a group. This would mean that virtually all items with a percentage of difficulty range between 0 to 15 percent and 85 to 100 percent difficulty would be omitted from the revised form of the test. Considering the nature and purpose of these tests, it was felt that for the first revision at least such items should be allowed to remain.

For the remaining matching questions in the Application of Principles test there was less need for revision of statement other than an occasional clarifying word. These items were rearranged in order of difficulty. In the last section one item "Shop for groceries needed." was added, because it was a necessary task in the preparation of a meal in this busy age.

In rearranging the sections of the test in the order of difficulty, the section of matching questions on preservation of food came first for it had the lowest percentage of difficulty. This was followed by the section on methods and principles involved in canning and freezing foods. The question involving the planning of a time schedule for the preparation of a meal came next in order of difficulty. Next to the last came the section of multiple-choice questions involving a variety of problems with the application of a specific principle. The most difficult section was the controlled-true-false statements so this section is being placed last in the test. It was interesting to note that the statements which were true were recognized as easier statements than were those false statements which had to be corrected. Table II gives this information.

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[9] Ibid., p. 119.

The process for determining item and question difficulty for the test on Definition of Terms was exactly the same as for the Application of Principles test. Here the number of papers in the W_H (higher group) and the W_L (lower group) was twenty-seven. This number was determined by multiplying 122 x .27. The middle group of 48 papers was also put aside.

Table III

AN ANALYSIS OF ERRORS MADE BY HIGH (W_H) AND LOW (W_L) GROUPS OF STUDENTS TO DETERMINE THE PERCENTAGE OF DIFFICULTY OF ITEMS IN THE TEST DEFINITION OF TERMS COMMONLY USED IN FOOD PREPARATION.

Item number	Number of errors W_L	Number of errors W_H	Total errors $W_L + W_H$	Percentage of difficulty
6	5	0	5	9
9	9	0	9	17
8	10	3	13	24
1	14	4	18	33
7	16	4	20	37
3	20	4	24	44
4	19	9	28	52
2	20	13	33	61
5	20	15	35	65
14	6	3	9	17
10	9	2	11	20
15	10	3	13	24
12	13	3	16	30
11	16	5	21	38
16	17	4	21	38
17	22	23	45	83
18	23	23	46	85
13	23	23	46	85
22	6	1	7	13
24	12	0	12	22
26	10	4	14	26
28	12	2	14	26
23	14	1	15	28
19	14	2	16	30
21	12	4	16	30
27	16	2	18	33
20	17	1	18	33
25	16	4	20	37

W_H= the upper group of 27 students.
W_L = the lower group of 27 students.

Table III (continued)

Item number	Number of errors W_L	Number of errors W_H	Total errors $W_L + W_H$	Percentage of difficulty
30	9	1	10	19
35	11	3	14	26
32	16	2	18	33
36	15	7	22	41
34	18	7	25	46
29	19	7	26	48
31	21	9	30	56
33	24	18	42	78
37	23	23	46	85
45	5	0	5	9
40	8	1	9	17
44	9	0	9	17
46	10	1	11	20
38	12	2	14	26
39	22	1	23	43
43	20	8	28	52
41	20	9	29	54
42	23	8	31	57
51	24	8	32	59
50	16	18	34	63
48	21	13	34	63
49	22	12	34	63
54	20	17	37	69
53	23	16	39	72
52	21	21	42	77
47	23	20	43	80
63	13	6	19	35
60	18	1	19	35
64	16	5	21	39
62	14	8	22	41
56	19	3	22	41
61	12	12	24	44
55	14	10	24	44
65	17	7	24	44
59	19	13	32	59
57	20	12	32	59
58	18	17	35	65

Table III (concluded)

Item number	Number of errors W_L	Number of errors W_H	Total errors $W_L + W_H$	Percentage of difficulty
69	2	0	2	3
70	9	0	9	17
67	9	0	9	17
74	8	4	12	22
68	12	0	12	22
66	13	1	14	26
75	9	8	17	31
71	13	5	18	33
73	11	13	24	44
72	23	17	40	74

In analyzing this test, as shown in Table III, there were no items with percentage of difficulty above 85 percent; so that, even following Ross's plan,[10] all items would have been allowed to remain in the revised test as far as difficulty was concerned. This test, as a whole, was not as difficult as the first one. Here the problem was chiefly concerned with an analysis and study of the statement to develop a greater discriminating quality for the item.

A summary of each section of the test indicated that a change in order of sections should be made in the revised edition. The easiest section seemed to be the one on processes involved in the preparation of food, followed by terms most commonly used. Because the section involving setting the table involved the same menu as was used in the section on using supplies, it followed that section although for percentage of difficulty it was the easier of the two. From the author's experience and observation it would appear that one way in which all students help at home is in setting the table for meals. The item which showed 74 percent of difficulty in that section was the location of the cup and saucer on the cover. In contrast,

[10] Ibid., p. 119.

all but two girls in the lower group knew where the dinner plate belonged, and only nine, or a percentage of 17, did not know the correct placement of the dinner knife.

Students had difficulty in determining the weight of raw vegetables to be used in preparing the potatoes and squash for the sample meal. These two items ranked 59 and 65 percent, respectively, for difficulty.

In analyzing the section on the use of eggs in cookery, it was found that the question involving somewhat unusual foods such as: croquettes, meringues and cream puffs gave greatest difficulty to both the high and the low groups of students for they ranked 83 and 85 percent of difficulty.

The sections on methods of cookery proved rather difficult. Only eight of the students recognized the term referring to baking eggs in milk or cream; whereas, only ten out of the fifty-four did not know the meaning of the term "poach."

The most difficult section in this test was that which involved common measurements used in preparing foods. About one eleventh, or five out of fifty-four students, did not know the number of quarts in a gallon, although eleven students thought a family of six people would use four quarts of ice cream for a dinner. Nine out of the fifty-four students did not know the number of cups in a pound of butter, or the number of cups in a half pint of cream, in spite of the fact that both are substances which the students use daily in their homes. Eighty percent did not know the number of medium-sized potatoes in a pound. Since South Dakota is a rural state and many of the students come from farms or small towns where there is a home supply of potatoes, it may not be surprising that they did not know how many persons

a pound of potatoes would serve. It was surprising though to find that 63 percent did not know the number of slices of bread which are in the common one and one-half pound loaf, when so much bread is sold in that size loaf. Seventy-two percent of the students did not know how many one-half inch pork chops would be in a pound, and 77 percent did not know how many average servings a pound of hamburger would make, yet these two cuts of meat are by far the most popular at the market.

Thus it seemed that, in addition to determining the order of sections in the revised test, several interesting items were discovered which were diagnostic in nature. This information should be of service in making the course better fit the needs of the students.

Item analysis of tests for discrimination:

In analyzing a test to determine the discriminating power of the item, the test maker must keep in mind that, theoretically, every item should distinguish between groups of students when ranked in order of merit. In other words, a question should be answered correctly by a higher percentage of the superior students than the average students and of the average students than of poor students.[11] Obviously, an item which was missed by everyone or by no one who took the test is of no value in discriminating between the good and the poor students. Such an item is called non-discriminating. Items may be classified as discriminating if there is a significant difference between the number of low students who missed them and the corresponding number of higher students who had them wrong. Items in which the higher group had a greater proportion of errors are classified as reversals or they are said to have negative discriminating power.

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[11] Arny, Clara B., Evaluation in Home Economics, op. cit., p. 326.

There are several reasons why an item may be non-discriminating. In some cases it may be too easy. This may be due to the fact that the content has been learned by all; sometimes the wording of the item is such that clues are self-evident or derogatory words make the statement obviously wrong. Sometimes the item may be so difficult that it has no discriminating value. In evaluating a test for discrimination, it is permissible to have an easy item at the beginning of the section to develop the confidence of the student, but all other items should have discriminating value.[12]

In computing the discriminating value of an item, the method used was to compare the differences in percentages of those who answered each item incorrectly in the best group (W_H) with those who answered it incorrectly in the lowest (W_L) of the group. Arny[13] found that a difference of 15 percent was generally satisfactory. For example, with thirty-one papers in each group being used in the Application of Principles test, item #20 with fifteen errors, or 50 percent of error by the low group, and eleven errors, or 35 percent of error for the high group, gave a difference of 15 percent. Tables IV and V indicate the differences in percentage of error for each item in the two tests.

When the analysis of the test items was made, those items needing revision were the reversals and those which had no discriminating value since the same number or more of the good students missed these items than did poor students. Items #50 and 61 of the Definition of Terms test related to the number of slices of bread in an average loaf, and item #73 to the setting of the table for a particular menu. The question arose as to whether the college students who missed these and other items had had high school homemaking. A survey was made of one class of college students to determine if

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12 Ibid., p. 333.

13 Ibid., p. 329

there was a comparison that could be made between the amount of training and experience the students had had and the number of items missed. This information is given in Table VI.

Table IV

AN ANALYSIS OF ERRORS MADE BY HIGH (W_H) AND LOW (W_L) GROUPS OF STUDENTS TO DETERMINE THE DISCRIMINATING VALUE OF EACH ITEM IN THE TEST ON APPLICATION OF PRINCIPLES INVOLVED IN FOOD PREPARATION.

Item number	Number of errors W_L	Number of errors W_H	Percentage of errors in W_L	Percentage of errors in W_H	Difference in percentage
15	27	29	90	94	-4
16	30	31	97	100	-3
12	10	10	33	33	0
1	31	31	100	100	0
10	27	27	87	87	0
14	28	28	90	90	0
27	15	14	50	45	5
28	26	25	84	80	4
24	4	3	12	10	2
19	30	29	97	94	3
2	3	2	10	6	4
31	17	14	55	45	10
21	30	26	97	83	14
11	27	23	90	74	16
20	15	11	50	35	15
23	29	25	94	80	14
29	22	18	70	58	12
9	13	8	42	25	17
8	8	3	25	10	15
6	21	16	70	51	19
5	31	25	100	80	20
25	9	3	30	9	21
32	13	7	42	22	20
17	12	6	39	19	20
22	10	3	33	10	23
18	29	22	94	70	24
7	31	24	100	77	23
3	29	22	94	70	24
30	9	0	30	0	30
13	14	5	45	16	29
26	28	18	90	58	32
4	24	14	77	45	32

W_L = the lower group of 31 students.
W_H = the upper group of 31 students.

Table IV (continued)

Item number	Number of errors W_L	Number of errors W_H	Percentage of errors in W_L	Percentage of errors in W_H	Difference in percentage
51	16	18	51	58	-8
47	25	24	80	77	3
56	23	21	74	67	7
53	10	8	33	25	8
50	22	20	70	64	6
43	24	22	77	70	7
42	20	18	64	58	6
38	26	24	83	77	6
48	4	1	13	3	10
54	24	21	77	67	10
49	20	16	64	51	13
45	25	21	80	67	13
41	27	23	87	74	13
35	27	22	87	70	17
44	16	11	51	34	17
55	20	14	64	45	19
39	25	19	80	61	19
37	12	6	39	19	20
58	16	8	51	25	26
52	17	9	54	29	25
60	23	14	74	45	29
57	10	1	33	3	30
46	16	7	51	23	28
40	26	16	83	51	32
59	25	12	80	39	41
36	21	8	67	25	42
33	22	9	70	29	41
34	26	13	83	41	42
61	13	8	41	25	16
69	21	16	67	51	16
70	8	1	25	3	22
68	13	2	41	6	35
64	15	4	48	13	35
63	23	12	74	39	35
68	17	6	54	19	35
66	16	5	51	16	35
62	14	1	45	3	42
67	19	2	61	6	55

Table IV (concluded)

Item number	Number of errors W_L	Number of errors W_H	Percentage of errors in W_L	Percentage of errors in W_H	Difference in percentage
76	23	21	74	67	-7
82	5	0	16	0	16
75	13	7	41	23	18
87	6	0	19	0	19
88	10	3	33	10	23
77	15	6	48	19	29
72	12	3	39	10	29
79	16	6	51	19	32
80	19	9	61	29	32
90	13	2	41	6	35
84	16	5	51	16	35
83	16	5	51	16	35
73	16	5	51	16	35
71	16	4	51	13	38
85	20	8	64	25	39
78	14	1	45	3	42
74	17	4	54	13	41
81	18	4	58	13	45
86	26	11	83	34	49
89	20	3	64	10	54
98	21	22	67	70	-3
96	8	2	25	6	19
95	18	12	58	39	19
99	21	13	67	41	26
97	12	3	39	10	29
92	23	13	74	41	33
91	18	7	58	23	35
93	12	0	39	0	39
94	20	4	64	13	51

Table V

AN ANALYSIS OF ERRORS MADE BY HIGH (W_H) AND LOW (W_L) GROUPS OF STUDENTS TO DETERMINE THE DISCRIMINATING VALUE OF EACH ITEM IN THE TEST ON THE DEFINITION OF TERMS USED IN FOOD PREPARATION

Item number	Number of errors W_L	Number of errors W_H	Percentage of errors in W_L	Percentage of errors in W_H	Difference in percentage
6	5	0	18	0	18
5	20	15	74	55	19
8	10	3	37	11	26
2	20	13	74	48	26
9	9	0	33	0	33
4	19	9	70	33	37
1	14	4	51	14	37
7	16	4	59	14	45
3	20	4	74	14	60
17	22	23	81	85	-4
18	23	23	85	85	0
13	23	23	85	85	0
14	6	3	22	11	11
15	10	3	37	11	26
10	9	2	33	7	26
12	13	3	48	11	37
11	16	5	59	18	41
16	17	4	63	14	49
22	6	1	22	4	18
26	10	4	37	14	23
21	12	4	44	14	30
28	12	2	44	7	37
24	12	0	44	0	44
19	14	2	51	7	44
25	16	4	59	14	45
23	14	1	51	4	47
27	16	2	59	7	52
20	17	1	63	4	59
37	23	23	85	85	0
33	24	18	88	66	22
30	9	1	33	4	29
35	11	3	40	11	29
36	15	7	55	26	29
34	18	7	67	26	41
29	19	7	70	26	44
31	21	9	77	33	44
32	16	2	59	7	52

W_L = the lower group of 27 students.

W_H = the upper group of 27 students.

Table V (concluded)

Item number	Number of errors W_L	Number of errors W_H	Percentage of errors in W_L	Percentage of errors in W_H	Difference in percentage
50	16	18	59	67	-8
52	21	21	77	77	0
54	20	17	74	63	11
47	23	20	85	74	11
45	5	0	18	0	18
40	8	1	29	4	25
53	23	16	85	59	26
48	21	13	77	48	29
44	9	0	33	0	33
46	10	1	37	4	33
38	12	2	44	7	36
49	22	12	81	44	37
41	20	9	74	33	41
43	20	8	74	29	45
42	23	8	85	29	56
51	24	8	88	29	59
39	22	1	81	4	77
61	12	12	44	44	0
58	18	17	67	63	4
55	14	10	51	37	14
62	14	8	51	29	22
59	19	13	70	48	22
63	13	6	48	22	26
57	20	12	74	44	30
65	17	7	63	26	37
64	16	5	59	18	41
56	19	3	70	11	59
60	18	1	67	4	63
73	11	13	40	48	-8
75	9	8	33	29	4
69	2	0	7	0	7
74	8	4	29	14	15
72	23	17	85	63	22
71	13	5	48	18	30
70	9	0	33	0	33
67	9	0	33	0	33
68	12	0	44	0	44
66	13	1	48	4	44

Table VI

CASE STUDIES SHOWING THE RELATIONSHIP BETWEEN BACKGROUND EXPERIENCES AND RESPONSES ON ITEMS HAVING ZERO OR NEGATIVE DISCRIMINATING POWER IN THE DEFINITIONS OF TERMS TEST.

Cases	Background experience (yrs.) High school homemaking (years)	4-H club food projects	Home	Responses by item no. (x = incorrect; -- = correct) 17 (-4)*	18 (0)*	13 (0)*	37 (0)*	50 (0)*	61 (0)*	73 (-8)*
a	0	1	some	x	x	x	x	--	x	--
b	2	0	some	x	x	x	--	--	x	--
c	1	4	some	x	x	--	x	x	--	--
d	0	4	some	x	x	x	x	--	--	--
e	2	0	much	x	x	x	x	--	--	--
f	0	4	much	--	--	x	x	x	x	--
g	3	4	much	x	x	--	x	x	x	--
h	2	2	much	x	x	x	x	x	x	--
i	5	2	some	x	x	x	x	x	--	--
j	3	0	some	--	--	x	x	x	--	--
k	0	4	much	x	x	x	x	--	x	x
l	3	1	some	--	x	x	x	--	--	--
m	0	0	much	x	x	--	--	--	--	--
n	0	0	some	x	x	x	--	--	--	--
o	3	0	some	x	x	--	x	--	x	--
p	3	3	much	x	x	x	x	x	x	--
q	3	5	some	x	x	x	x	x	--	--
r	3	0	some	x	x	--	x	x	x	--
s	2	1	some	x	x	x	x	x	--	x
t	2	3	much	x	x	--	x	--	--	--
u	1	2	some	x	x	x	x	x	--	x
v	2	1	some	x	x	--	x	--	x	x
w	2	0	some	x	x	x	--	--	x	x
x	3	4	much	x	x	x	x	x	--	--
y	0	0	much	x	x	x	--	--	x	--

Table VI (concluded)

Cases	Background experience (yrs.) High school homemaking	4-H club food projects	Home	Responses by item no. (x = incorrect; -- = correct) 17 (-4)*	18 (0)*	13 (0)*	37 (0)*	50 (0)*	61 (0)*	73 (-8)*
[illegible]	3	2	some	x	x	--	x	--	x	--
aa	0	0	some	x	x	x	x	--	--	--
bb	2	2	some	x	x	--	x	--	--	x
cc	0	3	some	x	x	x	--	--	--	--
dd	2	0	much	x	x	x	x	x	--	x
ee	2	0	much	x	x	x	x	x	--	x
ff	0	6	some	x	x	x	x	x	--	x
gg	1	0	little	x	x	x	x	--	--	x
hh	1	0	some	x	x	x	x	x	--	--
ii	3	0	some	x	x	x	x	x	--	x
jj	1	0	some	x	x	x	x	--	x	--
kk	0	0	none	x	x	x	x	--	--	--
ll	2	0	some	x	x	x	x	x	--	--
mm	2	8	much	x	x	x	x	x	--	x
nn	1	1	some	x	x	x	x	x	x	x
oo	2	2	some	x	--	x	x	--	--	--

*Discriminating power.

Table VII

BACKGROUND OF THIRTY-NINE STUDENTS TAKING THE TESTS.

Experience in years number	Type of Experience	
	High school homemaking number	4-H club food projects number
0	10	17
1	6	4
2	12	6
3	10	3
4-5	1	8
8	0	1
Total	39	39

From this table and a comparison of the errors made it was found that students who had enrolled in high school homemaking from one to three years or who had belonged to and worked on 4-H club food projects missed the items as consistently as did those with no such background. Neither did the amount of experience in cooking and foods work in the home have any noticeable affect on the answers made to the items. One student had had no home experience, one had had little home experience, twenty-five had had some and twelve had had much home experience.

In the case of item #17 in the Definition of Terms test, the term croquettes must not have been a part of the student's vocabulary because when the table for the difficulty was examined, that item rated 83 percent of difficulty. In fact, out of the sixteen items in the two tests with no or negative discrimination value, all but four had a difficulty rating of 63 percent or above, with nine being above 80 percent. These items seem to prove the rule that very difficult items have little or no discriminating power. Further analysis of those items which were below the 15 percent margin of difference indicated that out of 42 such items twelve were in

the 85-100 percent of difficulty classification and four were in the 0-15 percent of difficulty range. This indicated that 38 percent were either too difficult or too easy. Further analysis of each difficult item indicated that the major difficulty was in the application of general principles of food preparation to a specific situation. Seven items contained technical words which were not familiar but, again, if the general principles of cookery had been known the terms would have been recognized.

In order to determine why certain items had no or negative discriminating value, a detailed item analysis followed for those items. The options of each item were analyzed to see which ones proved more attractive to the good students than to the poor students. Table VIII gives this information for two items.

Table VIII

DETAILED ANALYSIS OF TWO ITEMS WHICH GREATLY DIFFERED IN DISCRIMINATING POWER.

Item number	Item options	Percentage checking each response	
		High group	Low group
51	A*	41	49
	B	3	12
	C	26	38
	D	29	0
52	A*	70.8	45.1
	B	22.1	45.1
	C	6.8	9.3
	D	0	0

*Correct option

Item #51 read: "The reason for cooking cocoa, sugar, and water for a short time to a smooth paste before adding the milk is to (A) cook the

starch so it will not settle out (B) prevent the scorching of the milk (C) prevent the formation of a scum on the cocoa (D) reduce the water content."

When an analysis of the item was made, it was found that more of the best group than of the lowest group checked option D as correct. The first decoy had more lure for the low group. The best group may have recognized the operation of another principle, namely, that moisture evaporates when cooking occurs, and thus checked option D. Whereas, in the low group where no one checked option D, no student recognized another principle at work in the situation. Thus this was a poor option as stated. It is being revised by rewording for clarifying purposes and by dropping option D and by inserting what is hoped will be a more discriminating option.

Item #52 read: "Because a cheese souffle is a protein food, it should be baked in an oven set at (A) 300-325° F. (B) 350-375° F. (C) 400° F. (D) 450° F." This item had a higher percentage selecting the correct item, in fact the percentage was over the 15 percent difference so that it had enough difference to warrant being included in the test. However, in this case option D had no discrimination value for no one in either group checked it. This decoy was dropped and a more plausible decoy inserted in the revised edition of the test.

Similar procedures were followed for other items in the test where the 15 percent difference rule indicated items of poor discrimination. Items are being changed for order, reworded or deleted.

D. Reliability of These Testing Devices:

After careful study and analysis of the component parts of each test,

the next procedure was to try to determine the objectivity, the validity and the reliability of the devices as a whole. Since both tests were objective in nature they had a rigid key for scoring and it might be assumed they would rate high in objectivity. They were easily given in one class period, and the instructions accompanying each section seemed adequate according to reports of teachers who had administered the trial tests.

The validity of the devices was a much more difficult feature to determine. Validity means truthfulness and is a test's most important characteristic.[14] The validity of a measuring device must be dependent upon the purpose for which it was designed. Since these devices were intended to be used for purposes of classification of freshman college students, it was the aim of this problem to perfect the two testing devices for this purpose. Until they are revised and perfected, they can not be actually used for this purpose. One criticism of these devices is that the two which were used are factual in nature. As explained in the reasons for the study and preliminary planning, other phases of background knowledge need to be discovered and utilized by the college foods teacher. So much of the information a student brings with her is valuable in her relationships with others. These two tests do not measure in any degree the emotional attitudes, genuine understandings or appreciations of an incoming freshman student. These two tests do not measure how a student could or would make intelligent application of knowledge in a new and challenging experience.

By the term reliability is meant its accuracy of measurement and self-consistency.[15] The reliability of a test is expressed in terms of

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[14] Ross, C. C., revised by J. C. Stanley, Measurement in Today's Schools, op. cit., p. 123.

[15] Arny, C. B., Evaluation in Home Economics, op. cit., p. 97.

coefficient of reliability. The reliability of the tests could be statistically computed. Different methods may be used to determine the reliability of a test. The author chose to use the split-half correlation method. In using this method, the procedure was as follows:

1. The tests were given to a sampling of 122 and 102 students, respectively.

2. When the tests were corrected, two scores were secured for each paper. One score was of the even-numbered items (2, 4, 6 and so on) and the other of the odd-numbered items (1, 3, 5 and so on).

3. From the two series of scores, a scatter diagram was constructed.*

4. By means of the data secured from the scatter diagram the Product-Moment formula was used to determine the coefficient of correlation for the chance-half.[16]

5. After this information was secured, the Spearman-Brown Prophecy formula was used to indicate the relationship between the split-halves and the entire test.

This method of computing the coefficient of reliability has some advantages and some shortcomings. One disadvantage is that the questions in the split-half of a test are rarely of the exact quality as those in the other half. Because of this the coefficients obtained by this method may be spuriously high, and one must be careful to interpret them accordingly.[17]

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[16]Edwards, Allen L., Statistical Analysis for Students of Psychology and Education, New York: Rinehart and Co., Inc., 1951, p. 94.

[17]Lindquist, E. F., A First Course in Statistics. New York: Houghton-Mifflin Co., 1942, p. 219.

*See Appendix, p. 52.

Its advantage is that it may be used in cases where it would be impractical to have two test forms or where the test can not be repeated at a later date to provide two series of scores.[18]

The reliability coefficient of the half- tests were found to be .720* and .721*. When these were transformed into a coefficient for the test as a whole the coefficient of reliability was .837* for both tests. This indicated several things about the tests. First it indicated a positive direct relationship: that is, that the two tests vary in the same direction, or high values in one half of the test were associated with high values or scores in the second half. Secondly, .837 indicated the degree of relationship. Such a relationship is relatively high because Ross[19] suggests the minimal requirements of the reliability coefficient for a single grade as .50 for determining the status of a group in a subject. Freeman[20] states that with a population of 100 a correlation coefficient of .258 is significant. Since the groups used in this problem were slightly over 100, any coefficient above this number should surely be considered significant.

The group tested has much to do with the reliability of the coefficient. When a group varies widely in ability, the coefficient of a test may show a higher tendency than it would if the group is quite homogeneous. Since this group was made up of high school juniors and seniors and college freshman, it would be considered homogeneous only in interest, but back-

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[18]Ross, C. C., revised by J. C. Stanley, op. cit., p. 123.

[19]Ibid., p. 125.

[20]Freeman, Frank S., Theory and Practice of Psychological Testing. New York: Henry Holt and Co., 1950, p. 67.

*See Appendix, p. 54.

grounds, ages and mentality would vary greatly. Consequently, the reliability coefficient may be higher than it should have been, but even with these limitations, the coefficient may be considered significant.

Another means by which the discriminating value of a test as a whole may be determined is to compute the standard deviations for the test. Arny says that the standard deviation "may be used to express the discrimination of a test or rating device."[21] The standard deviation may be used as a measure of variability.

Table IX

INFORMATION FOR COMPUTING THE STANDARD DEVIATION OF THE APPLICATION OF PRINCIPLES TEST.

Interval	f	cf	d	fd	fd^2
70-74	2	122	+5	10	50
65-69	5	120	+4	20	80
60-64	8	115	+3	24	72
55-59	13	107	+2	26	52
50-54	27	94	+1	27	27
45-49	24	67			
40-44	31	43	-1	-31	31
35-39	6	12	-2	-12	24
30-34	2	6	-3	- 6	18
25-29	3	4	-4	-12	48
20-24	1	1	-5	- 5	25
			Totals	+41	427

Mean

$$M = M_1 + \frac{i \times \Sigma fd}{N}$$

$$M = 47.5 + 5 \cdot \frac{41}{122}$$

$$= 47.5 + 1.68$$

$$= 49.18 \text{ or } \underline{49.2}$$

Standard Deviation

$$SD = i\sqrt{\frac{\Sigma fd^2}{N} - \left(\frac{\Sigma fd}{N}\right)^2}$$

$$SD = 5\sqrt{\frac{427}{122} - \left(\frac{41}{122}\right)^2}$$

$$= 5\sqrt{3.5 - (.336)^2}$$

$$= 5\sqrt{3.5 - .113}$$

$$= 5\sqrt{3.387}$$

$$= 5 \times 1.87 = \underline{9.20}$$

[21] Arny, C. B., Evaluation in Home Economics. op. cit., p. 288.

The Application of Principles test has a range of 23-73 errors; when the computation was finished and the standard deviation was found to be 9.2 with a mean of 49.2, it was found that the test has a range of three standard deviations above the mean and three standard deviations below the mean score, or a range of six standard deviations. The Definition of Terms test showed a somewhat more homogeneous grouping.

Table X

INFORMATION FOR COMPUTING THE STANDARD DEVIATION OF THE DEFINITION OF TERMS TEST

Interval	f	cf	d	fd	fd^2
49-52	4	102	+5	20	100
45-48	6	98	+4	24	96
41-44	5	92	+3	15	45
37-40	11	87	+2	22	44
33-36	13	76	+1	13	13
29-32	20	63			
25-28	15	43	-1	-15	15
21-24	12	28	-2	-24	48
17-20	10	16	-3	-30	90
13-16	6	6	-4	-24	96
				Total +1	547

Mean

$$M = M_1 + i\frac{\Sigma fd}{N}$$

$$M = \frac{29 + 32}{2} + \frac{4 \times 1}{102}$$

$$M = \frac{61}{2} + \frac{4}{102}$$

$$M = 30.5 + .039$$

$$M = \underline{30.54}$$

Standard Deviation

$$SD = i\sqrt{\frac{\Sigma fd^2}{N} - \left(\frac{\Sigma fd}{N}\right)^2}$$

$$= 4\sqrt{\frac{547}{102} - \left(\frac{1}{102}\right)^2} = 4\sqrt{5.36 - .00002}$$

$$= 4\sqrt{5.35998}$$

$$= 4 \times 2.31 = \underline{9.24}$$

In this test the mean was 30.54 and the standard deviation was 9.24. The high score of errors was 52 and the low was 13 so that all scores would have been grouped between five standard deviations. This would indicate

that the Application of Principles test was a little better test than the Definition of Terms test, although both meet the standard of coming within four to six standard deviations if the test is to be reliable.

Statistically then these two tests would indicate a significant reliability rating. They seem to meet the criteria for a satisfactory measuring device as far as reliability is concerned.

CONCLUSIONS

From this study several conclusions may be drawn. First, evidence was found to substantiate the belief that students entering college home economics classes come with a wide difference in knowledge and variety of experiences which a foods teacher must utilize if the class is to be challenging to all. For example, it was found that one student had had five years of homemaking instruction in school while 25 percent of the students in the class had had no formal homemaking instruction at the high school level. Since South Dakota is a rural state it was not surprising to find that 56 percent of one college class of thirty-nine students had carried 4-H Club food projects. All but one student in this section had had some experience with the preparation of food in the home. Obviously, experiences and information presented in a college foods class could better meet the needs of students if some device were available to measure the stage of learning at which the college instruction should begin.

Because of the high percentage of item difficulty in the Application of Principles test, the author believes that students are less conscious of the principles involved in the preparation of any food than they are of the skill itself. In her opinion, it would seem that teachers at the high school level have not emphasized sufficiently the application of general principles or understandings which could be applied to many food preparation situations. The same sections of the tests which had a high degree of difficulty also had a low degree of discrimination. Therefore, a test which has an average difficulty of over 50 percent does not discriminate between the good and the poor students because too large a percentage of both miss the items.

The author found that the actual order of items in the test as administered for experimental purposes was not good. In the revised tests, the problem of item order has been remedied. The items in the revised form appear in order of increasing difficulty and thus give encouragement to the students on the first part of the test.

In summarizing the data from the Definition of Terms test, the author found a greater degree of homogeneity than in the Application of Principles test. Students were more familiar with common terms referring to the vocabulary of cooking and meal preparation than they were with the application of cookery principles of food preparation.

Because the reliability coefficient for both the Definition of Terms and Application of Principles tests as a whole reached .837, the author believes that this is a significant correlation. The tests are consistent in testing the information which they were designed to test. Because the range of scores in the Application of Principles test was six standard deviations and five standard deviations for the Definition of Terms test, it would seem that both are sufficiently reliable to be considered usable.

Although these devices are still in an embryonic stage and need further refining, they appear to be a step in the right direction. Even assuming that the reliability coefficient of .837 on the tests as a whole is too high, it would still seem that they warrant a trial use for the purpose for which they were designed, the classification of freshman students in college foods classes.

RECOMMENDATIONS BASED UPON FINDINGS FROM THE STUDY

In view of the fact that the reliability coefficient of these two measuring devices was high, the author makes the following suggestions for further study of the problem:

1. That the revised testing devices be given a trial test on the incoming freshman home economics students in the 1954-1955 fall quarter at South Dakota State College.

2. That the results be used for purposes of classification of students into foods classes.

3. That further correlations be computed between scores secured on the refined tests with the A.C.E. scores available from the College personnel office.

4. That the devices for checking attitudes and practices be refined so that they may contribute to a more complete portrait of each student.

5. That the practical test be used if possible on a few of those students who rank in the +3 standard deviation group in both the factual tests and who show considerable interest in the subject as evidenced by their responses to the attitudes and practices check lists.

It is hoped that this study may be instrumental in inspiring the author to go on to perfect the devices so that they may become worthwhile contributions to the field of testing in home economics.

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APPENDIX

Correlation Chart for Computation of Pearson-Product Moment Coefficient of Correlation

X

X = Errors of Even Items on Application of Principles Test

Y	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	36-37	f	d	fd	fd^2	xy	d_{xy}
38-39									• 1				•• 2		3	14	42	589	29	406
36-37											• 1				1	13	13	169	9	117
34-35					•• 2			• 1	• 1	• 1					5	12	60	720	27	324
32-33				• 1		• 1	• 1	•• 2		•• 2	•• 3	• 1			11	11	121	1331	76	836
30-31				• 1			•• 2	•• 3	•• 2	• 1			• 1		10	10	100	1000	63	630
28-29				•• 2	* 1	:: 3	X· 6	·· 2	X 5						19	9	171	1539	96	864
26-27			• 1	•• 2	X· 6	:: 3	:: 4	× 5	:: 3	:: 3					27	8	216	1728	130	1040
24-25			• 1	:: 3	X· 6	:: 4	:: 4	• 1	• 1						20	7	140	980	74	518
22-23		• 1	• 1		:: 4	:: 2				• 1					9	6	54	324	29	174
20-21					:: 3	• 1	:: 3								7	5	35	175	28	140
18-19			• 1				• 1								2	4	8	32	6	24
16-17		•• 2		• 1		• 1	•• 2								6	3	18	54	16	48
14-15		• 1													1	2	2	4	0	0
12-13															0	1	0	0	0	0
10-11		• 1													1	0	0	0	0	0
f		5	4	10	22	15	23	14	13	8	4	1	3	0	122		980	8644	583	5221
d		0	1	2	3	4	5	6	7	8	9	10	11	12						
fd		0	4	20	66	60	115	84	91	64	36	10	33	0	583					
fd^2		0	4	40	198	240	575	504	637	512	324	100	363	0	3497					
xy		14	25	77	162	110	170	129	122	74	46	11	38	0	980					
d_{xy}		0	25	158	486	440	850	774	854	592	514	110	418	0	5221					

$$r = \frac{\frac{\sum xy}{N} - (c_x)(c_y)}{(\sigma_x)(\sigma_y)} =$$

Computation of the Reliability Coefficient of the Test by Use of the Spearman Brown Prophecy Formula

$$r_w = \frac{2r_{\frac{1}{2}}}{1+r_{\frac{1}{2}}}$$

$$r_w = \frac{2 \times .721}{1+.721}$$

$$r_w = \frac{1.442}{1.721}$$

$$r_w = .837$$

r_w = estimated reliability of whole test

$r_{\frac{1}{2}}$ = correlation between scores on chance halves

Correlation Chart for Computation of Pearson-Product-Moment Coefficient of Correlation

X

x = Errors on Even-Numbered Items Definition of Terms Test

	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	f	d	fd	fd^2	xy	Σxy
27-28										1				1	11	11	121	9	99
25-26								1	1	1	1	1		5	10	50	500	45	450
23-24					1		2	2	1	2			1	9	9	81	729	68	612
21-22			1		1	3	1	4	1	1	1	1		14	8	112	896	93	744
19-20				1	2	1	3	1	1					9	7	63	441	49	343
17-18			2		3	5	5		1					16	6	96	576	79	474
15-16			1	2	2	3	4			1				13	5	65	325	64	320
13-14	1	1	2	3	6	3	1							17	4	68	272	59	236
11-12		2	3	1	1		1							8	3	24	72	21	63
9-10		1	1	3	1									6	2	12	24	16	32
7-8			2	1										3	1	3	3	7	7
5-6			1											1	0	0	0	2	0
3-4																			
f	1	4	13	11	17	15	17	8	5	6	2	2	1	102		585	3959	512	3380
d	0	1	2	3	4	5	6	7	8	9	10	11	12						
fd	0	4	26	33	68	75	102	56	40	54	20	22	12	512					
fd^2	0	4	52	99	272	375	612	392	320	486	200	242	144	3198					
xy	4	12	46	39	88	88	104	67	40	52	18	18	9	585					
Σxy	0	12	92	117	352	440	624	469	320	468	180	198	108	3380					

$$r = \frac{\frac{\Sigma xy}{N} - (c_x)(c_y)}{(\sigma_x)(\sigma_y)} =$$

Computation of the Product-Moment Correlation Coefficient from a Correlation Chart

(1) $\Sigma xy = \left[\Sigma xy - \frac{(\Sigma f_x)(\Sigma f_y)}{N}\right] i_x \cdot i_y$

$\Sigma xy = \left[d_y \Sigma x_y - \frac{(\Sigma x_y)(f_y d_y)}{N}\right] i_x \cdot i_y$

$= \left[3380 - \frac{512 \times 585}{102}\right] 2 \cdot 2 = [3380 - 2936.47]\,4$

$= 443.43 \times 4$

$\Sigma xy = 1773.72$

(2) $\Sigma y^2 = \left[\Sigma f_y^2 - \frac{(\Sigma f_y)^2}{N}\right] i_y^2$

$\Sigma y2 = \left[\Sigma f_y d_y^2 - \frac{(\Sigma f_y d)^2}{N}\right] i_y^2$

$= \left[3959 - \left(\frac{585}{102}\right)^2\right] 2^2 = [3959 - 3355.14]\,4$

$\Sigma y^2 = 603.86 \times 4 = 2415.44$

(3) $\Sigma x^2 = \left[\Sigma f x^2 - \frac{(\Sigma f x)^2}{N}\right] i_x^2$

$\Sigma x^2 = \left[f_y d^2 - \frac{(\Sigma f_y d_y)^2}{N}\right] i_x^2$

$= \left[3198 - \left(\frac{512}{102}\right)^2\right] 2^2 = [3198 - 2570.03]\,4$

$= 628 \times 4$

$\Sigma x^2 = 2512$

(4) $r_{xy} = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \Sigma y^2}}$

$r_{xy} = \frac{1773.72}{\sqrt{2512 \times 2415.44}}$

$= \frac{1773.72}{\sqrt{6,067,585.28}} = \frac{1773.7}{2463.2}$

$r_{xy} = .720$

Computation of the Reliability Coefficient of the Whole Test by Use of the Spearman Brown Prophecy Formula

$$r_{ww} = \frac{2r_{\frac{1}{2}\frac{1}{2}}}{1+r_{\frac{1}{2}\frac{1}{2}}}$$

$$r_{ww} = \frac{2 \times .720}{1+.720}$$

$$r_{ww} = \frac{1.440}{1.720}$$

$$r_{ww} = .837$$

r_{ww} = Estimated reliability of whole test

$r_{\frac{1}{2}\frac{1}{2}}$ = Correlation between scores on odd and even halves

APPLICATION OF PRINCIPLES INVOLVED IN FOOD PREPARATION

Name _____
Possible Score _____
Errors _____

Directions: If the statement is true, place a T in the blank; if the statement is false, cross out the word or phrase which makes the statement incorrect and place the correct word or phrase in the blank. No underlined word or phrase may be changed and the addition of not will not correct the error.

Example:

rennin — In the making of commercial cheese the curd of the milk is precipitated by ~~lactic acid~~.

1. _____ All water-soluble carbohydrates are sugars such as monosaccharides and polysaccharides.

2. _____ In preparing cooked cereals the most accepted method of combining ingredients is to pour the cereal slowly into rapidly boiling water, stirring constantly.

3. _____ The gluten of pastry flour is more elastic and will hold more water than other flours.

4. _____ Muffins made with tartrate baking powders should be baked at slightly higher temperature than those made with sulfate-phosphate baking powder.

5. _____ In the sterilization of milk, it is heated to 140° F. and held at this temperature for at least 30 minutes before it is quickly cooled.

6. _____ Baked custard made with egg yolks may use a lower oven temperature for baking than do those made with whole egg.

7. _____ Evaporated milk has sugar added in its manufacture so that it contains about 40% carbohydrate.

8. _____ Sterile eggs are less subject to deterioration during storage than are fertile eggs.

9. _____ The curdling of cooked custards is called syneresis.

10. _____ If cauliflower is cooked in an alkaline water it keeps its white color.

11. _____ If beets are cooked using an alkaline water they keep the bright red color.

12. _____ Cabbage keeps a mild flavor if it is cut into small pieces and cooked until tender in a covered utensil with a small amount of liquid added.

_____ 13. Because vitamins are oxidized by air, it is recommended that boiling water be added when cooking vegetables.

_____ 14. Fruits lose as much vitamin content by cooking as do vegetables.

_____ 15. If fruits are to retain their shape in cooking, they should be cooked in water and the sugar added near the end of the process.

_____ 16. Wilted lettuce leaves contain considerable less ascorbic acid than do crisp ones.

_____ 17. Coffee is best if it is made with water that is kept just below boiling for a short period of time.

_____ 18. In order to make good quality jelly from a fruit juice it is necessary to have the proper proportions of pectin, acid and water.

_____ 19. When making cocoa one should beat the mixture to combine the ingredients.

_____ 20. When lemon is added to iced tea the acid causes the tannin solution to lose color.

_____ 21. High heat or long cooking affect cheese by making it lose its color.

_____ 22. Mold on cheese does not impair its flavor.

_____ 23. Cheese gets its flavor from yeasts and bacteria.

_____ 24. Milk tends to scorch easily because of coagulated proteins which settle to the bottom when heated.

_____ 25. Caramelized lactose gives evaporated milk its flavor.

_____ 26. French dressing is an example of permanent emulsion.

_____ 27. The proportions for a pour batter are 1 cup flour to 1 cup liquid.

_____ 28. Muffins are an example of a pour batter.

_____ 29. Muffins should be carefully mixed till smooth.

_____ 30. If correct proportions are used, slight kneading of biscuits gives them a tender flaky crumb.

_____ 31. Roasts with a thick surface layer of fat will take less time to cook than those with no fat covering.

_____ 32. High oven temperatures for meat cookery causes the meat to have less shrinkage, to be more tender and to be more juicy.

DIRECTIONS: Place an X on the letter preceding the statement which corresponds to the correct word or phrase.

Example:

A B C D The leavening agent usually used in cakes with shortening is (A) soda (B) air (C) baking powder (D) steam.

A B C D 33. The principle of gelatinization of starch to thicken a substance is utilized in the making of (A) potato chips (B) blanc mange (C) baked custard (D) baked squash.

A B C D 34. Which of the following foods does not depend upon gelatinization for its consistency? (A) chocolate pudding (B) tapioca pudding (C) cooked oatmeal (D) cooked custard.

A B C D 35. Which of the following materials could not be used as a separating agent when cooking starchy foods? (A) melted fat (B) a hot liquid (C) a cold liquid (D) sugar.

A B C D 36. One incorrect reason for cooking breakfast cereals is (A) to soften the cellulose (B) to cook the starch and protein (C) to reduce the water content (D) to improve the flavor.

A B C D 37. The protein in wheat flour is important in the making of breads because of the content of (A) phosphorus (B) amino acids (C) glucose (D) gluten.

A B C D 38. When making corn muffins the chief leavening agent is (A) steam (B) carbon dioxide (C) air (D) soda.

A B C D 39. The chief leavening agent in popovers is (A) steam (B) carbon dioxide (C) air (D) soda.

A B C D 40. If chocolate cake turns a dark red-chocolate color and has an exceedingly tender crumb it is an indication that the cook has used too much (A) baking powder (B) cocoa (C) chocolate (D) soda.

A B C D 41. Sometimes when baking powder biscuits are served one can see brown specks on the crust areas; such specks are caused by an excess of (A) flour (B) milk (C) baking powder (D) fat.

Judy is making a muffin recipe calling for essential ingredients of 2 cups flour, 3 teaspoons baking powder and 1 cup milk. When she was assembling the ingredients she found that the milk was sour. In order to use the sour milk she had to neutralize it with soda.

A B C D 42. How much soda should she use? (A) $\frac{1}{4}$ teaspoon (B) 3/8 teaspoon (C) $\frac{1}{2}$ teaspoon (D) 1 teaspoon.

A B C D 43. How much baking powder would still be needed to complete the leavening of the muffins? (A) $\frac{1}{4}$ teaspoon (B) $\frac{1}{2}$ teaspoon (C) 1 teaspoon (D) 2 teaspoons.

A B C D 44. Which of the following are not included in the term "quick breads"? (A) waffles (B) muffins (C) ginger bread (D) refrigerator rolls.

A B C D 45. Which of the following procedures is not recommended for making cream of tomato soup? (A) Separate the starch grains for the white sauce by using melted butter. (B) Add a pinch of soda to the tomatoes before combining the ingredients. (C) Slowly add the tomato mixture to the thin white sauce and stir constantly. (D) Mix the tomato and white sauce mixture just before serving.

A B C D 46. To prevent the formation of a ferrous sulfide deposit on the yolk of a hard cooked egg one should (A) cool for 30 minutes (B) select only white eggs for hard cooking (C) allow the eggs to cool gradually in the cooking water (D) cool the eggs immediately in cold water.

A B C D 47. Eggs are used in food mixtures for several reasons. Pick out the incorrect reason: (A) as a stabilizer (B) as a leavening agent (C) as a thickening agent (D) to clarify.

A B C D 48. The method of cooking potatoes which causes the least loss of food nutrients is to (A) boil (B) scallop (C) french fry (D) bake.

A B C D 49. The process by which dried prunes regain their original shape is called (A) curing (B) osmosis (C) dehydration (D) pasteurization.

A B C D 50. Which one of these practices may cause apples to turn dark when peeled? (A) dropping them into a salt solution (B) covering them with diluted lemon juice (C) dropping them into a sugar syrup (D) peeling them with a steel-bladed knife.

A B C D 51. The reason for cooking the cocoa, sugar and water for a short time to a smooth paste before adding the milk is to (A) cook the starch so it will not settle (B) prevent the scorching of the milk (C) prevent the formation of a scum on the cocoa (D) reduce the water content.

A B C D 52. Because a cheese souffle is a protein food it should be baked in an oven set at (A) 300-325° F. (B) 350-375° F. (C) 400° F. (D) 450° F.

A B C D 53. The vitamin content of fruits is found chiefly (A) in the pulp (B) near the outer skin (C) near the seed (D) in the seed.

A B C D 54. Pick out the one unacceptable procedure for doing the dishes. (A) Rinse and stack like dishes together. (B) Wash silverware first. (C) Use hot sudsy water and friction to wash dishes. (D) Rinse all dishes with very hot water.

A B C D 55. A piece of shoulder blade beef would be best prepared by (A) broiling (B) pan frying (C) braising (D) simmering.

A B C D 56. "Pot-roasting" is really a method of cooking meat by (A) roasting uncovered in the oven (B) braising (C) broiling (D) simmering.

A B C D 57. Pick out the incorrect method of disposing of the liquid in which vegetables are cooked. (A) Use as the liquid for meat gravy. (B) Use as the liquid for soups. (C) Use for the liquid in vegetable gelatin salads. (D) Pour it away as it sours very rapidly.

A B C D 58. Because a sponge cake is largely egg it should be baked in an oven set at (A) 250-275° F. (B) 300-325° F. (C) 350-400° F. (D) 400-450° F.

A B C D 59. Yeast rolls and pie crusts are baked in an oven set at (A) 275° F. (B) 300° F. (C) 350° F. (D) 425° F.

A B C D 60. Hydrated gelatin may be changed to a jelly-like consistency by (A) adding cold fruit juice (B) boiling for 5 minutes (C) adding a hot liquid (D) allowing it to set in a refrigerator for three hours.

APPLICATIONS INVOLVED IN THE PRESERVATION OF FOOD

Directions: Place an X on the letter indicating the principle which best fits the situation. A principle may be used more than once if necessary.

Principles:

A. Enzymes and most micro-organisms are destroyed at temperatures of 212° F.
B. Enzyme activity is responsible for chemical changes in food.
C. Some micro-organisms have the ability to produce spores which are highly resistant to adverse conditions.
D. High concentrations of salt will keep food from spoiling, if the food is carefully covered or sealed.

Example.

A B C X Pork treated in a brine will keep for long periods of time.

A B C D 61. Dill pickles for future use will keep in an earthenware jar in a cool basement.

A B C D 62. Sweet corn which has been picked and allowed to stand at room temperature will lose much of its sugar content in 12 hours.

A B C D 63. Sometimes home-canned snap beans processed in the waterbath may be responsible for a food poisoning called botulism.

A B C D 64. Winter apples which are allowed to stand in a cool basement will become sweeter than when they were put in storage.

A B C D 65. Home canned peaches or plums will keep if they have been sterilized during the canning process.

Principles:
A. Exposure to high temperatures for an adequate time will destroy all micro-organisms and enzymes.
B. Degree of maturity has direct bearing on the quantity and quality of acid and pectin in fruit.
C. The speed with which heat will penetrate to the center of a jar or can is dependent upon the density of the contents and the length of the processing time.
D. The higher the acid content of a food, the less is the resistance of micro-organisms to heat.

A B C D 66. Tomatoes may be safely canned by the open-kettle method.

A B C D 67. Cream style corn must be processed for a longer period of time than whole kernel corn.

A B C D 68. It is recommended that snap beans be home canned in a pressure cooker.

A B C D 69. Beets will require a shorter processing time than will spinach.

A B C D 70. When making jelly there should be some ripe and some under-ripe fruit such as currants and blackberries.

Principles Involved in the Freezing of Food:
A. Blanching destroys enzymes which might change the flavor or color of the food.
B. Enzymes may cause changed to occur in frozen foods that make the food unpalatable.
C. Enzymes and micro-organisms and their spores remain dormant as long as freezing temperatures are maintained, but become active upon thawing.
D. Quality of plant tissue deteriorates quickly after harvesting if kept at room temperature.
E. Air in contact with frozen food will cause undesirable changes to occur.

A B C D E 71. Frozen foods should not be allowed to thaw and then be refrozen.

A B C D E 72. Foods for freezing must be carefully wrapped before freezing.

A B C D E 73. Asparagus should be frozen immediately after cutting so that some of the starch does not change to cellulose.

A B C D E 74. When freezing vegetables it is best to pick and process relatively small amounts at one time.

A B C D E 75. Maintaining a temperature of 0° F. is best if storing frozen foods.

A B C D E 76. Frozen fruits are best if served just before they are completely defrosted.

A B C D E 77. Freezer burn is caused by improper packaging of meat prior to freezing.

A B C D E 78. Vegetables are treated with boiling water or steam and then rapidly cooled before being frozen.

METHODS OF CANNING:

Directions: Place an X on the letter of the best method of preservation to use in each of the following cases:

METHODS:

A. Common storage
B. Fast freezing
C. Open kettle
D. Pressure cooker
E. Water bath

A B C D E 79. Canning apple juice to be used later for jelly.

A B C D E 80. Canning tomatoes when one is anxious to retain the shape.

A B C D E 81. Keeping home cured and smoked bacon.

A B C D E 82. Keeping potatoes for winter use.

A B C D E 83. Preserving garden peas by complete cooking.

A B C D E 84. Preserving garden peas to retain garden-fresh color and flavor.

A B C D E 85. Canning watermelon pickles.

A B C D E 86. Keeping pheasant or chicken for long periods of time for immediate use when opened.

A B C D E 87. Keeping root vegetables in a cool basement.

A B C D E 88. The method most frequently used to make fruits into sauce.

A B C D E 89. Method which retains most of the nutritive value of the fresh fruit.

A B C D E 90. Method used when making fruits into jam.

Application of Principles Involved in Food Preparation

KEY

1. Disaccharides
2. T
3. All purpose
4. T
5. Pasteurization
6. Higher
7. Condensed
8. T
9. T
10. Turns yellow
11. Acid
12. T
13. T
14. Less
15. In heavy syrup
16. Vitamin A
17. T
18. Sugar
19. Prevent formation of a scum
20. T
21. Become tough
22. T
23. Molds
24. T
25. T
26. Mayonnaise
27. T
28. Drop
29. Only until flour is moistened
30. T
31. T
32. Low
33. B
34. D
35. B
36. C
37. D
38. B
39. A
40. D
41. C
42. C
43. C
44. D
45. B
46. D
47. B
48. D
49. B
50. D
51. A
52. A
53. B
54. B
55. C
56. B
57. D
58. B
59. D
60. C
61. D
62. B
63. C
64. B
65. A
66. D
67. C
68. A
69. C
70. B
71. C
72. E
73. D
74. D
75. C
76. C
77. E
78. A
79. C
80. E
81. A
82. A
83. D
84. B
85. C
86. D
87. A
88. C or E
89. B
90. C
91. B
92. C
93. A
94. D
95. A
96. D
97. D
98. C
99. C

Name _____
Possible Score _____
Errors _____

DEFINITIONS OF TERMS COMMONLY USED IN FOOD PREPARATION

Below are foods or food substances frequently made use of or prepared in the average home. Match the term with the definition which best indicates its composition or method of preparation by placing the letter in the blank preceding the definition.

A. Albumin	E. Custard	I. Omelet
B. Caffeine	F. Fondue	J. Pudding
C. Casein	G. Gluten	K. Souffle
D. Cellulose	H. Meringue	L. Yolk

_____ 1. A light, delicately browned, tender egg dish prepared on top of the stove or in the oven.
_____ 2. An easily digested cooked dessert made of eggs, milk, sweetening and flavoring.
_____ 3. A dish prepared with well beaten egg whites to which other ingredients in a thick white sauce are blended and baked.
_____ 4. A term referring to the white of the egg.
_____ 5. A baked dessert which is made of beaten egg whites, sugar and flavoring; this dessert is frequently used as a base for ice cream.
_____ 6. The slightly bitter stimulating substance found in coffee.
_____ 7. The chief protein in milk.
_____ 8. A carbohydrate substance found in fruits and vegetables which adds bulk to food.
_____ 9. The protein found in wheat flour.

Eggs may be used for several different reasons in food preparation. Indicate your knowledge of term used by placing the letter in the blank preceding the number which illustrates the process.

A. Binding	C. Coating	E. Emulsifying	G. Leavening
B. Clarifying	D. Coloring	F. Flavoring	H. Thickening

_____ 10. To keep particles of oil suspended in liquid as in mayonnaise.
_____ 11. To cause crumbs to adhere to breaded veal chops.
_____ 12. To make coffee clear and full bodied when making a large amount.
_____ 13. To give structure to cream puffs and popovers.
_____ 14. To help an angel food cake to rise.
_____ 15. To make consomme clear.
_____ 16. To make a baked custard.
_____ 17. To help keep the shape of croquettes.
_____ 18. To make meringue on lemon pie.

The Language of Cookery

Below are terms frequently used in recipes to describe what is to be done. Match the terms with the process by placing the letter in the blank preceding the process.

A. Baste	E. Cut	I. Process
B. Beat	F. Fold	J. Scramble
C. Blanch	G. Knead	K. Steep
D. Cream	H. Marinate	L. Stir

_____ 19. To let stand in a French dressing before serving.
_____ 20. To cook in a sealed container for a period of time.
_____ 21. To incorporate egg whites into a mixture and maintain its light texture.
_____ 22. To manipulate with a pressing motion accompanied by folding and stretching.
_____ 23. To let water just below the boiling point stand on tea leaves till the desired strength and flavor is secured.
_____ 24. To plunge into boiling water or steam for a short period and then dip into cold water.
_____ 25. To incorporate air into egg whites.
_____ 26. To manipulate and blend sugar and shortening until it is a fluffy mass.
_____ 27. To moisten meat or other food while cooking to add flavor and to prevent drying of the surface.
_____ 28. To incorporate fat into dry ingredients with the least amount of blending.

Below are terms used to indicate methods of cookery. Match the terms with the process by placing the letter in the blank.

A. Bake	F. Fry	K. Scramble
B. Boil	G. Poach	L. Shirr
C. Braise	H. Saute	M. Simmer
D. Broil	I. Saute	O. Stew
E. Caramelize	J. Scallop	

_____ 29. To simme r meat and/or vegetables in a small amount of liquid.
_____ 30. To cook in liquid, being careful to retain the shape, as eggs.
_____ 31. To brown meat in a small amount of fat and then cook slowly in a covered pan with a small amount of liquid.
_____ 32. To cook by dry heat usually in an oven, for example, ham.
_____ 33. To brown or cook rapidly in a small amount of fat with frequent turning.
_____ 34. To cook under or over direct heat.
_____ 35. To heat sugar until a light brown color and characteristic flavor develops.
_____ 36. To cook in liquid just below the boiling point.
_____ 37. To bake eggs in milk or cream.

Common measurements used in food preparation. Place the letter of the correct amount in the blank.

A. 1	D. 4	G. 8	J. 20
B. 2	E. 5	H. 12	K. 24
C. 3	F. 6	I. 16	

_____ 38. How many tablespoons in one cup?
_____ 39. How many teaspoons in one tablespoon?
_____ 40. How many cups in one pound of butter?
_____ 41. How many cups in a can of fruit or vegetable juice weighing 16 ounces?
_____ 42. How many tablespoons of cocoa plus one-half tablespoon of fat will equal one ounce or one square of chocolate?
_____ 43. How many tablespoons in an average-sized egg?
_____ 44. How many cups in one-half pint of cream?
_____ 45. How many quarts in a gallon?
_____ 46. How many cups in a quart?
_____ 47. How many medium-sized potatoes in a pound?
_____ 48. How many medium-sized tomatoes in a pound?
_____ 49. How many cups in a pound of all-purpose flour?
_____ 50. How many slices of bread in a one and one-half pound loaf of bread?
_____ 51. How many pounds of granulated sugar will four and one-half cups make?
_____ 52. How many average servings will a pound of hamburger make?
_____ 53. How many chops cut $\frac{1}{2}$" thick are in a pound of pork chops?
_____ 54. How many cups in a number 303 can?

How would you budget your supplies if you were to prepare the following dinner for a family consisting of father, a farmer: mother, homemaker; daughters, ages 15 and 6, both in school; son, 13 years old, in school?

MENU

Baked Meat Balls with Mushroom Sauce
Baked Potatoes Baked Squash
Tomato Aspic Salad
Bread Butter
Ice Cream
Coffee Milk

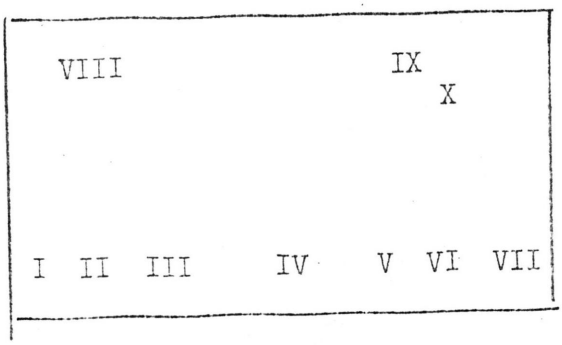
Indicate the amount of the following supplies which you would use in preparing the above menu.

_____ lb. 55. Hamburger
_____ cans 56. Mushroom soup
_____ lb. 57. Potatoes
_____ lb. 58. Squash
_____ amt. 59. Tomato juice
_____ pkg. 60. Gelatin
_____ slices 61. Bread
_____ lb. 62. Butter
_____ amt. 63. Ice cream
_____ Tbs. 64. Coffee for adults
_____ cups 65. Milk for children

Indicate how you would set each cover at the table for the above menu by writing the letter of the linen, china, glassware or silver which corresponds to the location of the Roman numeral in the blank provided.

A. Bread and butter plate
B. Coffee spoon
C. Cup and saucer
D. Dinner fork
E. Dinner knife
F. Dinner plate
G. Glass of milk
H. Glass of water
I. Napkin
J. Salad fork
K. Salad plate
L. Teaspoon

____ 66. I
____ 67. II
____ 68. III
____ 69. IV
____ 70. V
____ 71. VI
____ 72. VII
____ 73. VIII
____ 74. IX
____ 75. X



Definitions of Terms Commonly Used in Food Preparation

KEY

1. I
2. E
3. K
4. A
45. H

6. B
7. C
8. D
9. G
10. E

11. C
12. B
13. A
14. G
15. B

16. H
17. C
18. G
19. H
20. I

21. F
22. G
23. K
24. C
25. B

26. D
27. A
28. E
29. O
30. G

31. C
32. A
33. H or I
34. D
35. E

36. M
37. L
38. I
39. C
40. B

41. B
42. C
43. C
44. A
45. D

46. D
47. C
48. C or D
49. D
50. K

51. B
52. E
53. C
54. B
55. 1 or $1\frac{1}{2}$

56. 1
57. 2
58. 1 or $1\frac{1}{2}$
59. 2 c. or 1 pt.
60. 1

61. 8-10
62. $\frac{1}{4}$
63. 1 qt.
64. 3 or 4
65. 3 or 4

66. I
67. D or J
68. J or D
69. F
70. E

71. L
72. C
73. K
74. H or G
75. G or H

APPLICATIONS OF PRINCIPLES INVOLVED IN FOOD PREPARATION
Revised 1954

Name _____ Possible Score _____
Odd Numbered Errors _____
Even Numbered Errors _____
Total Errors _____

Applications Involved in the Preservation of Food

Directions: Place an X on the letter indicating the principle which best fits the situation. A principle may be used more than once if necessary.

Principles:
A. Enzymes and most micro-organisms are destroyed at temperatures of 212° F.
B. Enzyme activity is responsible for chemical changes in food.
C. Some micro-organisms have the ability to produce spores which are highly resistant to adverse conditions.
D. High concentrations of salt will keep food from spoiling, if the food is carefully covered or sealed.

Example:
A B C X Pork treated in a brine will keep for long periods of time.

A B C D 1. Home-canned peaches or plums will keep if they have been sterilized during the canning process.

A B C D 2. Sweet corn which has been picked and allowed to stand at room temperature will lose much of its sugar content in 12 hours.

A B C D 3. Winter apples which are allowed to stand in a cool basement will become sweeter than when they were put in storage.

A B C D 4. After fermenting to cure, dill pickles will keep in an earthenware jar in a cool basement.

A B C D 5. Sometimes home-canned snap beans processed in the waterbath may be responsible for a food poisoning called botulism.

Principles:

A. Exposure to high temperatures for an adequate time will destroy all micro-organisms and enzymes which cause spoilage.
B. Degree of maturity has direct bearing on the quantity and quality of acid and pectin in fruit.
C. The speed with which heat will penetrate to the center of a jar or can is dependent upon the density of the contents and the length of the processing time.
D. The higher the acid content of a food, the less is the resistance of micro-organisms to heat.

A B C D 6. When making juice for jelly, there should be some ripe and some under-ripe fruit such as currants and crab apples.

A B C D 7. Tomatoes may be safely canned by the open-kettle method.

A B C D 8. Cream-style corn must be processed for a longer period of time than whole kernel corn.

A B C D 9. It is recommended that snap beans be home canned in a pressure cooker.

A B C D 10. Beets will require a shorter processing time than will spinach.

Methods of Canning:

Directions: Place an X on the letter of the best methods of preservation to use in each of the following cases:

METHODS: A. Common storage B. Fast freezing C. Open kettle D. Pressure cooker E. Water bath

A B C D E 11. Keeping potatoes for winter use.

A B C D E 12. Keeping root vegetables in a cool basement.

A B C D E 13. The method most frequently used to make fruits into sauce.

A B C D E 14. Method used when making fruits into jam.

A B C D E 15. Preserving garden peas to retain garden-fresh color and flavor.

A B C D E 16. Preserving garden peas by complete cooking.

A B C D E 17. Canning apple juice to be used later for jelly.

A B C D E 18. Keeping fowl or game for future cooking.

A B C D E 19. Method which retains most of the nutritive value of the fresh fruit.

A B C D E 20. Canning watermelon pickles.

A B C D E 21. Canning tomatoes when one is anxious to keep the shape.

A B C D E 22. Keeping pheasant or chicken for long periods of time for immediate use when opened.

Principles Involved in the Freezing of Food:

A. Blanching destroys enzymes which might change the flavor or color of the food.
B. Enzymes may cause changes to occur in frozen foods that make the food unpalatable.
C. Enzymes and micro-organisms and their spores remain dormant as long as freezing temperatures are maintained, but become active upon thawing.
D. Quality of plant tissue deteriorates quickly after harvesting if kept at room temperature.
E. Air in contact with frozen food will cause undesirable changes to occur.

A B C D E 23. Foods for freezing must be carefully wrapped before freezing.

A B C D E 24. Vegetables are treated with boiling water or steam and then rapidly cooled before being frozen.

A B C D E 25. Maintaining a temperature of 0° F. is best if storing frozen foods.

A B C D E 26. Frozen foods should not be allowed to thaw and then be refrozen.

A B C D E 27. Freezer burn is caused by improper packaging of meat prior to freezing.

A B C D E 28. Asparagus should be frozen immediately after cutting so that some of the starch does not change to cellulose.

A B C D E 29. When freezing vegetables it is best to pick and process relatively small amounts at one time.

A B C D E 30. Frozen fruits are best if served just beforethey are completely defrosted.

Time Schedule for Preparation of a Meal:

Judy is going to prepare the luncheon below. She will have two guests in addition to her own family of five members. She must prepare all food for the menu; therefore careful planning and managing is necessary.

Directions: Place an X on the letter preceding each task which indicates the time at which she should do that task.

Menu

Tuna-biscuit Roll-ups with White Sauce
Carrot-pineapple molded salad
Buttered peas
Apple crisp Milk Tea

Time to Work at Preparation:
A. At some time before the meal preparation is actually begun.
B. At the beginning of the meal preparation
C. Between the time the meal is started and the last 15 or 20 minutes.
D. The last 15 or 20 minutes.

Tasks to be Done:
A B C D 31. Pour the water for the adults and the milk for the children.

A B C D. 32. Make the gelatin salad.

A B C D 33. Make the tea

A B C D 34. Cook the fresh frozen peas in a small amount of water.

A B C D 35. Make the tuna-biscuit roll-ups.

A B C D 36. Make the apple crisp.

A B C D 37. Make the white sauce.

A B C D 38. Shop for the groceries needed.

A B C D 39. Set the table for the main course.

A B C D 40. Clean and dry the lettuce for the salad to be placed upon.

Directions: Place an X on the letter preceding the statement which corresponds to the word or phrase which best completes the statement.

Example:
A B E D The leavening agent ususally used in cakes with shortening is (A) soda (B) air (C) baking powder (D) steam.

A B C D 41. The method of cooking potatoes which causes the least loss of food nutrients is to (A) boil (B) scallop (C) French fry (D) bake.

A B C D 42. Pick out the incorrect method of disposing of the liquid in which vegetables are cooked. (A) Use the liquid for meat gravy. (B) Use as the liquid for soups. (C) Use for the liquid in vegetable gelatin salads. (D) Pour away as it sours very rapidly.

A B C D 43. The protein in wheat flour is important in the making of breads because of the content of (A) phosphorus (B) amino acids (C) glucose (D) gluten.

A B C D 44. The vitamin content of fruits is found in largest amounts (A) in the pulp (B) near the outer skin (C) near the seed (D) in the seed.

A B C D 45. Because a sponge cake is largely egg, it should be baked for the greater portion of time in an oven set at (A) 250-275° F. (B) 300-325° F (C) 350-375° F. (D) 400-450° F.

A B C D 46. To prevent the formation of ferrous sulfide deposits on the yolk of a hard-cooked egg one should (A) cool for 30 minutes (B) select only white eggs for hard cooking (C) allow the eggs to cool gradually in the cooking water (D) cool the eggs immediately in cold water.

A B C D 47. One incorrect reason for cooking breakfast cereals is (A) to soften the cellulose (B) to cook the starch and protein (C) to reduce the water content (D) to improve the flavor.

A B C D 48. Because a cheese souffle is a protein food it should be baked in an oven set at (A) 300-325° F. (B) 350-375° F. (C) 375-400° F. (D) 400-425° F.

A B C D 49. Which of the following are not included in the term "quick breads"? (A) waffles (B) muffins (C) popovers (D) refrigerator rolls.

A B C D 50. The principle of gelatinization of starch to thicken a substance is utilized in the making of (A) potato chips (B) cream pie filling (C) baked custard (D) baked squash.

A B C D 51. When making cocoa, the reason for cooking the cocoa, sugar and water for a short time until a smooth paste is formed and then adding the hot milk is to (A) cook the starch so it will not settle on standing (B) prevent the scorching of the milk (C) prevent the formation of a scum on the cocoa (D) develop the flavor.

A B C D 52. A piece of shoulder blade beef would be best prepared by (A) broiling (B) pan frying (C) braising (D) simmering.

A B C D 53. The process by which dried prunes regain their original shape is called (A) curing (B) osmosis (C) dehydration (D) pasteurization.

A B C D 54. Which of the following procedures is not recommended for making cream of tomato soup? (A) Separate the starch grains for the white sauce by using melted butter. (B) Add a pinch of soda to the tomatoes before combining the ingredients. (C) Slowly add the tomato mixture to the thin white sauce and stir constantly while combining. (D) Mix the tomato and white sauce mixture just before serving.

A B C D 55. Hydrated gelatin may be changed to a jelly-like consistency by (A) adding cold fruit juice (B) boiling for 5 minutes (A) adding a hot liquid, stirring and then chilling (D) allowing the mixture to set in a refrigerator for three hours.

A B C D 56. Yeast rolls and pie crusts are baked in an oven set at (A) 275° F. (B) 300° F. (C) 350° F. (D) 425° F.

Judy is making a muffin recipe calling for the essential ingredients of 2 cups flour, 3 teaspoons baking powder and 1 cup milk. When she was assembling the ingredients she found that the milk was sour. In order to use the sour milk she had to neutralize it with soda.

A B C D 57. How much soda should she use? (A) $\frac{1}{4}$ teaspoon (B) 3/8 teaspoon (C) $\frac{1}{2}$ teaspoon (D) 1 teaspoon.

A B D E 58. How much baking powder would still be needed to complete the leavening of the muffins? (A) $\frac{1}{4}$ teaspoon (B) $\frac{1}{2}$ teaspoon (C) 1 teaspoon (D) 2 teaspoons.

A B C D 59. Which of the following foods do <u>not</u> depend upon gelatinization for their consistency? (A) vanilla pudding (B) tapioca pudding (C) cooked oatmeal (D) cooked custard.

A B C D 60. Which one of these practices may cause apples to turn dark when peeled? (A) dropping them into a salt solution (B) covering them with diluted lemon juice (C) dropping them into a sugar syrup (D) allowing them to stand at room temperature till ready to use.

A B C D 61. If chocolate cake turns a dark red-chocolate color and has an exceedingly tender crumb it is an indication that the cook has used extra (A) cocoa (B) baking powder (C) chocolate (D) soda.

A B C D 62. "Pot-roasting" is really a method of cooking meat by (A) roasting uncovered in the oven (B) braising (C) broiling (C) simmering.

A B C D 63. The chief leavening agent in cream puffs is (A) steam (B) carbon dioxide (C) air (D) soda.

A B C D 64. Pick out the one <u>unacceptable</u> procedure for doing the dishes. (A) Rinse and stack like dishes together. (B) Wash silverware first. (C) Use hot sudsy water and friction to wash dishes. (D) Rinse all washed dishes with very hot water.

A B C D 65. Eggs are used in food mixtures for several different reasons; pick out the <u>incorrect</u> reason. (A) as a stabilizer (B) as a shortening (C) as a thickening agent (D) as a clarifying agent.

A B C D 66. Which one of the following materials could <u>not</u> be used as a separating agent when cooking starchy foods? (A) melted fat (B) a hot liquid (C) a cold liquid (D) sugar.

A B C D 67. When making corn muffins the chief leavening agent is (A) steam (B) carbon dioxide (C) air (D) soda.

A B C D 68. Sometimes when baking powder biscuits are served, one can see brown specks on the crust areas; such specks are caused by an excess of (A) flour (B) milk (C) baking powder (D) fat.

Directions: If the statement is true, place a T in the blank; if the statement is false, cross out the word or phrase which makes the statement incorrect and place the correct word or phrase in the blank. No underlined word or phrase may be changed and the addition of not will not correct the error.

Example:

rennin In the making of commercial cheese the curd of the milk is precipitated by the action of ~~lactic acid~~.

_____ 69-70. In preparing cooked cereals the most accepted method of combining ingredients is to pour the cereal slowly into rapidly boiling water while stirring constantly.

_____ 71-72. Milk tends to scorch easily because of coagulated proteins which settle to the bottom when heated.

_____ 73-74. If correct proportions are used, slight kneading of biscuits gives them a tender flaky crumb.

_____ 75-76. Eggs may be kept at room temperature in a grocery store for several days and not loose freshness or viscosity.

_____ 77-78. The caramelization of milk sugars during the process of preservation gives evaporated milk flavor.

_____ 79-80. Mold on cheese does not impair its flavor.

_____ 81-82. Coffee is best if it is made with water that is kept just below boiling for a short period of time.

_____ 83-84. Because vitamins are oxidized by air, it is recommended that boiling water be added when cooking vegetables.

_____ 85-86. Cabbage keeps a mild flavor if it is cut into small pieces and cooked only until tender in a covered utensil with a small amount of liquid.

_____ 87-88. High temperatures for meat cookery causes the meat to shrink less, to be more tender and more juicy.

_____ 89-90. The curdling of stirred custards is caused by over-cooking.

_____ 91-92. When lemon is added to iced tea, the acid causes the solution to become paler in color.

_____ 93-94. The proportions of flour and liquid for a pour batter are 1 cup flour to 1 cup liquid.

_____ 95-96. Roasts with a surface layer of fat will take less time to cook than will those with no fat covering.

_____ 97-98. Baked custard made with egg yolks may use a lower oven oven temperature for baking than do those made with whole egg.

_____ 99-100. Muffins made with tartrate baking powders may be stirred more than those made with sulfate-phosphate baking powder.

_____ 101-102. The ingredients in muffins should be carefully mixed till smooth.

_____ 103-104. French dressing is an example of a permanent emulsion.

_____ 105-106. If beets are cooked using an alkaline water, they will keep the bright red color.

_____ 107-108. Muffins are an example of a pour batter.

_____ 109-110. The gluten of cake flour is more elastic and will hold more liquid than other flours.

_____ 111-112. In order to make good quality jelly from a fruit juice, it is necessary to have the proper proportions of pectin, acid and water.

_____ 113-114. Cheese gets its flavor from yeasts and bacteria.

_____ 115-116. If cauliflower is cooked in an alkaline water it keeps its white color.

_____ 117-118. Evaporated milk has sugar added in its manufacture so that it contains about 40% carbohydrate.

_____ 119-120. If fruits are to retain their shape in cooking, they should be cooked in water and the sugar added near the end of the process.

_____ 121-122. Fruits because of their acid content tend to lose as much vitamin content by cooking as do vegetables.

_____ 123-124. In the sterilization of milk, it is heated to 140° F. and held at this temperature for at least 30 minutes before it is quickly cooled.

_____ 125-126. High heat or long cooking affect cheese by making it lose its color.

_____ 127-128. When making cocoa, one should beat the mixture with a rotary beater to combine the ingredients.

_____ 129-130. Wilted green lettuce leaves contain considerably less ascorbic acid (vitamin C) than do crisp fresh ones.

_____ 131-132. All water-soluble carbohydrates are sugars such as monosaccharides and polysaccharides.

Application of Principles Used in Food Preparation

KEY

1. A
2. B
3. B
4. D
5. C

6. B
7. D
8. C
9. A
10. C

11. A
12. A
13. C or E
14. C
15. B

16. D
17. C
18. B
19. B
20. C

21. E
22. D
23. E
24. A
25. C

26. C
27. E
28. D
29. D
30. C

31. D
32. A
33. D
34. D
35. B

36. A
37. C
38. A
39. A or C
40. C

41. D
42. D
43. D
44. B
45. B

46. D
47. C
48. A
49. D
50. B

51. A
52. C
53. B
54. B
55. C

56. D
57. C
58. C
59. D
60. D

61. D
62. B
63. A
64. B
65. B

66. B
67. B
68. C
69-70. T
71-72. T

73-74. T
75-76. refrigerated temperature
77-78. T
79-80. T
81-82. T

83-84. T
85-86. T
87-88. Low
89-90. T
91-92. T

93-94. T
95-96. T
97-98. Higher
99-100. Less
101-102. Only till the flour is moistened

103-104. Mayonnaise
105-106. Acid
107-108. Drop
109-110. All purpose or general purpose flour

111-112. Sugar
113-114. Molds and bacteria
115-116. Turns yellow
117-118. Condensed milk
119-120. Heavy syrup or syrup

121-122. Less or much less
123-124. Pasteurization
125-126. Become tough
127-128. To prevent formation of a scum

129-130. Vitamin A
131-132. Disaccharides

DEFINITION OF TERMS COMMONLY USED IN FOOD PREPARATION
Revised 1954

Name _____

Possible score _____
Odd numbered errors _____
Even numbered errors _____
Total errors _____

The Language of Cookery

Below are terms frequently used in recipes to describe what is to be done. Match the terms with the process by placing the letter in the blank preceding the process.

A. Baste	D. Cream	G. Knead	J. Scramble
B. Beat	E. Cut	H. Marinate	K. Steep
C. Blanch	F. Fold	I. Process	L. Stir

_____ 1. To manipulate with a pressing motion accompanied by folding and stretching.

_____ 2. To plunge into boiling water or steam for a short period and then dip into cold water.

_____ 3. To manipulate and blend sugar and shortening until it is a fluffy mass.

_____ 4. To incorporate fat into dry ingredients with the least amount of blending.

_____ 5. To let water just below the boiling point stand on tea leaves until the desired strength and flavor is secured.

_____ 6. To let stand in a French dressing before serving.

_____ 7. To incorporate egg whites into a mixture and maintain its light texture.

_____ 8. To moisten meat or other food while cooking to add flavor and to prevent drying of the surface.

_____ 9. To cook in a sealed container for a period of time.

_____ 10. To incorporate air into egg whites.

Below are foods or food substances frequently made use of or prepared in the average home. Match the term with the definition which best indicates its composition or method of preparation by placing the letter in the blank preceding the definition.

A. Albumen	D. Cellulose	G. Gluten	J. Pudding
B. Caffeine	E. Custard	H. Meringues	K. Souffle
C. Casein	F. Fondue	I. Omelet	L. Yolk

_____ 11. The slightly bitter stimulating substance found in coffee.

_____ 12. The protein found in wheat flour.

_____ 13. A carbohydrate substance found in fruits and vegetables which adds bulk to food.

_____ 14. A light, delicately browned, tender egg dish prepared on top of the stove or in the oven.

_____ 15. The chief protein in milk.

_____ 16. A dish prepared with well beaten egg whites to which other ingredients in a thick white sauce are blended and baked.

_____ 17. A term referring to the white of an egg.

_____ 18. An easily digested cooked dessert made of eggs, milk, sweetening and flavoring.

_____ 19. A baked dessert which is made of beaten egg whites, sugar and flavoring; this dessert is frequently used as a base for ice cream.

How would you budget the supplies if you were to prepare the following dinner for a family consisting of a father, a farmer; a mother, homemaker; daughters, aged 15 and 6, both in school; a son, 13 years old, in school

MENU

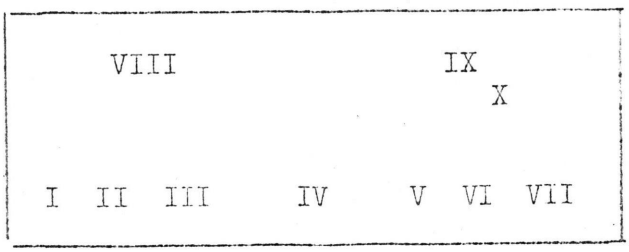
Baked Meat Balls with Mushroom Sauce
Baked Potatoes Baked Squash
Tomato Aspic Salad
Bread Butter
Ice Cream
Coffee Milk

Indicate the amount of the following supplies which you would use in preparing the above menu.

_____ amt.	20. Ice cream	_____ slices	25. Bread
_____ pkg.	21. Gelatin	_____ lb.	26. Hamburger
_____ tbs.	22. Coffee for adults	_____ cups	27. Milk for children
_____ lb.	23. Butter	_____ amt.	28. Tomato juice
_____ can(s)	24. Mushroom soup	_____ lb.	29. Potatoes
		_____ lb.	30. Squash

Indicate how you would set each cover at the table for the menu in the preceding question by writing the letter of the linen, china, glassware or silver which corresponds to the location of the Roman numeral in the blank provided.

A. Bread and butter plate
B. Coffee spoon
C. Cup and saucer
D. Dinner fork
E. Dinner knife
F. Dinner plate
G. Glass of milk
H. Glass of Water
I. Napkin
J. Salad fork
K. Salad plate
L. Teaspoon



_____ 31. IV
_____ 32. V
_____ 33. II
_____ 34. IX
_____ 35. III
_____ 36. I
_____ 37. X
_____ 38 VI
_____ 39. VIII
_____ 40. VII

Eggs may be used for several different reasons in food preparation, Indicate your knowledge of the different used by placing the letter in the blank preceding the number which illustrates the process.

A. Binding
B. Clarifying
C. Coating
D. Coloring
E. Emulsifying
F. Flavoring
G. Leavening (to incorporate air)
H. Thickening

_____ 41. To help an angelfood cake to rise.
_____ 42. To keep particles of oil suspended in liquid, as in mayonnaise.
_____ 43. To make consomme clear.
_____ 44. To make coffee clear and full-bodied when making a large amount.
_____ 45. To cause crumbs to adhere to breaded veal chops.
_____ 46. To make a baked crust.
_____ 47. To help maintain the shape of croquettes.
_____ 48. To make meringue on cream pie.
_____ 49. To give structure to cream puffs and popovers.

Below are terms used to indicate methods of cookery. Match the terms with the process by placing the letter in the blank.

A. Bake	F. Fry	K. Shirr
B. Boil	G. Poach	L. Simmer
C. Braise	H. Saute	M. Stew
D. Broil	I. Scallop	
E. Caramelize	J. Scramble	

_____ 50. To cook in liquid being careful to retain the shape, as eggs.
_____ 51. To heat sugar until light brown color and a characteristic flavor develops.
_____ 52. To cook by dry heat usually in an oven.
_____ 53. To cook in liquid just below the boiling point.
_____ 54. To cook under or over direct heat.
_____ 55. To cook meat and vegetables in a small amount of liquid.
_____ 56. To brown meat in a small amount of fat and then cook slowly in a covered pan with a small amount of liquid.
_____ 57. To brown or cook rapidly in a small amount of fat with frequent turning.
_____ 58. To bake eggs in milk or cream.

Common measurements used in food preparation. Place the letter of the correct amount in the blank.

A. 1	D. 4	G. 8	J. 20
B. 2	E. 5	H. 12	K. 24
C. 3	F. 6	I. 16	L. 36

_____ 59. How many quarts in a gallon?
_____ 60. How many cups in one pound of butter?
_____ 61. How many cups in one-half pint of cream?
_____ 62. How many cups in a quart?
_____ 63. How many tablespoons in one cup?

_____ 64. How many teaspoons in one tablespoon?
_____ 65. How many teaspoonfuls in an average-sized egg?
_____ 66. How many cups in a can of juice weighing 16 ounces?
_____ 67 . How many tablespoons of cocoa plus one-half tablespoon of fat will equal one ounce of one square of chocolate.
_____ 68. How many pounds of granulated sugar will four and one half cups make.

_____ 69. How many slices of bread in a one and one-half pound loaf of bread?
_____ 70. How many medium sized tomatoes in a pound?
_____ 71. How many cups in a pound of all-purpose flour.
_____ 72. About how many cups in a number 303 can?
_____ 73. How many chops cut $\frac{1}{2}$inch thick are there in a pound of pork chops?
_____ 74. How many people will a pound of hamburger serve when made into meat loaf?
_____ 75. How many medium sized potatoes in a pound?

Definition of Terms Commonly Used in Food Preparation.

KEY

1. G
2. C
3. D
4. E
5. K

6. H
7. F
8. A
9. I
10. B

11. B
12. G
13. D
14. I
15. C

16. K
17. A
18. E
19. H
20. 1 quart

21. 1 pkg.
22. 3-4 T.
23. 1/3-1/4 lb.
24. 1 can
25. 8-10

26. 1-1½ lb.
27. 3-4 cups
28. 2 c. or 1 pt.
29. 2 lb.
30. 1-2 lb.

31. F
32. E
33. J or D
34. H or G
35. D or J

36. I
37. G or H
38. B or L
39. K
40. C

41. G
42. E
43. B
44. B
45. C

46. H
47. C
48. G
49. A
50. G

51. E
52. A
53. L
54. D
55. M

56. C
57. H
58. K
59. D
60. B

61. A
62. D
63. I
64. C
65. C

66. B
67. C
68. B
69. K
70. C or D

71. D
72. B
73. C
74. E
75. C

Number of Errors on Application of Principals Test

Total errors	Odd errors	Even errors	Total errors	Odd errors	Even errors
47	31	16	42	24	18
52	30	22	42	23	19
52	32	20	42	26	16
51	27	24	49	32	17
50	28	22	49	29	20
63	34	29	48	28	20
61	32	29	48	27	21
55	28	27	45	26	19
28	16	12	43	20	23
38	24	14	43	23	20
50	28	22	43	23	20
50	28	22	42	24	18
51	23	28	42	24	18
54	30	24	42	25	17
56	27	29	41	20	21
53	34	19	39	17	22
53	27	26	38	17	21
53	27	26	33	17	16
51	27	24	35	22	13
52	27	25	29	16	13
53	30	23	65	32	33
49	27	22	58	31	27
45	28	17	55	29	26
44	26	18	52	28	24
44	27	17	73	39	34
44	26	18	52	27	25
48	26	22	52	34	18
44	26	18	65	38	27
46	25	21	65	31	34
46	28	18	62	32	30
46	25	21	62	32	30
46	27	19	60	35	25
45	28	17	59	30	29
44	25	19	58	33	25
47	26	21	57	31	26
43	24	19	55	32	23
40	17	23	55	28	27
41	22	19	55	27	28
40	21	19	55	30	25
54	26	28	40	22	18
54	30	24	40	21	19
49	27	22	40	26	14
72	38	34	41	25	16
56	32	24			
61	32	29			

Total errors	Odd errors	Even errors	Total errors	Odd errors	Even errors
63	32	31			
48	26	22			
41	23	18			
47	25	22			
46	24	22			
44	24	20			
53	26	27			
50	24	26			
51	27	24			
55	29	26			
55	28	27			
67	37	30			
60	34	26			
51	27	24			
46	24	22			
43	21	22			
40	24	16			
42	19	23			
42	20	22			
44	25	19			
44	26	18			
44	24	20			
47	27	20			
48	24	24			
48	25	23			
50	29	21			
50	28	22			
51	29	22			
52	29	23			
23	10	13			
27	14	13			
34	19	15			
37	22	15			
39	20	19			

Number of Errors on Definition of Terms Test

Total errors	Odd errors	Even errors	Total errors	Odd errors	Even errors
13	6	7	30	18	12
15	8	7	28	14	14
24	13	11	25	13	12
23	12	11	25	14	11
21	13	8	20	14	6
20	10	10	18	11	7
18	8	10	18	9	9
17	13	4	17	12	5
16	9	7	15	8	7
15	10	5	23	13	10
22	14	8	16	11	5
18	11	7	20	10	10
20	12	8	21	12	9
22	10	12	23	15	8
23	14	9	24	14	10
24	17	7	24	13	11
25	15	10	26	14	12
27	14	13	27	16	11
28	14	14	28	17	11
29	15	14	30	19	11
30	17	13	31	16	15
31	16	15	31	17	14
32	16	16	32	19	13
33	18	15	33	17	16
33	18	15	35	20	15
33	17	16	25	13	12
25	15	10	26	18	8
27	16	11	27	12	15
28	15	13	29	15	14
29	19	10	29	18	11
30	17	13	30	14	16
31	17	14	31	20	11
31	15	16	32	21	11
34	21	13	35	21	14
35	19	16	35	22	13
46	22	24	38	21	17
38	21	17	37	20	17
37	21	16	39	21	18
39	24	15	39	24	15
40	23	17	46	25	21