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## ABSTRACT

AN EXPLORATORY STUDY IN ADJUSTING LEARNING EXPERIENCES OF COLLEGE FRESHMEN IN A BEGINNING FOODS AND NUTRITION COURSE TO INDIVIDUAL DIFFERENCES

IN ABILITY, ACHIEVEMENT, EXPERIENCE
AND INTEREST
By

Louise Byrum Burnette

## The Problem

A wide range of differences exists among college freshmen, especially in state institutions of higher learning where no selective admission policies are used. In the relatively small school with limited faculty and physical facilities where the study was undertaken, it seemed advisable to study ways of working with students of varying abilities, interests, and experiences within a single class section.

The major purpose of the study was to investigate the effectiveness of adjusting learning experiences to the individual differences of college students in a beginning foods and nutrition course. A second objective was to determine which factor, or combination of factors, would be most useful in evaluating a student's qualifications for purposes of placement in class sections, grouping
within a class section or granting exemption from the course.

Methods, Techniques and Data Used

The data for the study were obtained from scores on four evaluation instruments administered prior to the course, The Cooperative Test in Foods and Nutrition, The Henmon-Nelson Tests of Mental Ability, The Johnson Home Economics Interest Inventory, and a survey of "Student Experiences in Foods and Nutrition."

The Johnson Interest Inventory was used a second time following the course, accompanied by an alternate form of the Cooperative Test to determine gains in interest and achievement as a result of the experimental procedure.

Students participating in the experimental and control sections were randomly selected, and those in the experimental section were subdivided into smaller groups according to similarity of qualifications as ascertained by the four instruments used. Course content for both sections was kept as similar as possible except that laboratory activities for the experimental section were varied according to the levels of ability of the groups. Similar laboratory activities were provided for all groups alike in the control section. Students in the experimental section were encouraged to become more actively involved in the learning situation through additional responsibilities for class demonstrations and projects of individual interest which
were not required of students in the control section.

## Findings and Conclusions

While there was some evidence in a positive direction that the experimental procedure might have been effective in increasing learning of the less qualified students and challenging those with a greater background of experience, the differences between the sections were not significant. However, the sample was small and the procedure might have shown more definite results if used with larger numbers or with additional groups of individuals.

The distinction shown in the study between the two methods was not great enough to favor homogeneous grouping exclusively in situations similar to the experimental one.

The instruments used for obtaining information about the students showed significant positive correlation with the criterion by which success in the course was judged. No single instrument alone would be adequate to predict an individual's probable accomplishment, but a combination of experience, intelligence, and achievement should be considered.

The findings confirmed the value of the instruments for dividing large groups into sections, or grouping within a class section. There was not enough evidence, however, to conclude that any one student might have been exempt from the course.

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# AN EXPLORATORY STUDY IN ADJUSTING LEARNING EXPERIENCES OF COLLEGE FRESHMEN IN A BEGINNING FOODS AND NUTRITION COURSE TO INDIVIDUAL DIFFERENCES IN ABILITY, ACHIEVEMENT, EXPERIENCE AND INTEREST <br> By <br> Louise Byrum Burnette 

A THESIS

Submitted to
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in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
College of Education
1964
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## CHAPTER I

## INTRODUCTION

Students enter college with varying degrees of ability, training and experience. In some areas, as in English and mathematics, those with unusually high ability as indicated by achievement test scores may be exempt from a beginning course, sometimes with credit allowed, and enroll in a more advanced course. Those who are extremely lacking in basic preparation are required to do remedial work before undertaking the prescribed curriculum. Particularly is this true in state supported colleges and universities where any graduate of an accredited high school must be admitted without regard for the usual criteria by which selective admission policies are established.

In home economics courses, especially foods, nutrition, and clothing, students also enter with a wide range of experiences varying from those with no previous high school training and/or little home experience in these areas to those with a very thorough preparation. Curriculum requirements have been such in many instances that all students, regardless of the amount of previous training, must take the same course. This practice has
created problems since there has been much repetition for some students, while others have difficulties because they lack adequate background.

For a number of years the members of the Home Economics Faculty at the University of Southwestern Louisiana have been concerned about the wide range of abilities and experiences in home economics among those students enrolling as freshmen or transfers in the School of Home Economics and about ways of providing learning experiences suitable to the varying needs of students. As a possible solution to the problem, this study was undertaken to explore the feasibility of grouping students with similar interests, abilities and past experiences in foods and nutrition and providing different levels of learning activities within a single class according to individual differences.

## Description of Situation

The University of Southwestern Louisiana is a state supported institution of higher education which achieved university status in the summer of 1960. The enrollment was approximately five thousand in 1960-61 when this study was in progress.

One hundred and thirty majors were enrolled in home economics of whom fifty-one were freshmen. There were ten members of the faculty which included two dietitians whose major responsibilities were food service. However, these
two dietitians taught some courses in institution management.

The home economics program included curricula for vocational home economics teacher education, institution management, home economics in business, and general home economics. The majority of the students were vocational home economics education majors. For this reason, the instruction in the basic home economics courses was directed toward the teaching profession, with primary emphasis on learning opportunities that would help students develop some degree of competence in the various areas of home economics.

A master's degree program with a major in education and a minor in home economics was the only opportunity at the graduate level open to home economics majors. There were no degree programs in the specialized areas of home economics such as foods and nutrition, clothing and textiles, housing, home management, family relations and child development. Consequently, the prerequisites, the sequence, the content, and methods usually required in undergraduate courses leading to a baccalaureate or graduate degree in a special subject matter area were not necessarily the same as those needed in a teacher education program.

A one-semester course in beginning foods and nutrition was required of all home economics freshmen. Since there were no chemistry or nutrition prerequisites
to this course, it was necessary that the course be taught at a more elementary level than if such courses preceded it. A one-hour lecture period and two two-hour laboratory sessions were scheduled weekly. Nutrition and meal management were required courses which followed the freshman foods and nutrition course. Other foods courses that could be elected were: advanced nutrition, diet and disease, food preservation, experimental cookery, advanced foods and gourmet cookery, and quantity cookery.

The physical facilities included a large, wellequipped laboratory containing six unit kitchens which would accommodate four students in each kitchen, or a total of twenty-four students. A smaller laboratory with three unit kitchens provided space for nine students.

## Purposes and Description of Study

With the relatively small enrollment and with the limitation of faculty and physical facilities, it was necessary that the class sections be heterogeneous in composition rather than homogeneous according to abilities and backgrounds of training and experience. Under the circumstances, it seemed advisable to study ways of working with students of varying abilities, interests and experiences within a single class section.

The major purpose of this study was to investigate the effectiveness of adjusting learning experiences to the individual differences of students in a beginning foods
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and nutrition course. Students with similar knowledge in foods and nutrition, abilities, interests and experiences were assigned to small groups within a heterogeneous class section.

Another aim of less importance, but essential in the study, was to determine which factor, or combination of factors, would be most useful in evaluating a student's background for purposes of making individual decisions as to placement in class sections, grouping within a class section or granting exemption from the course.

Freshmen enrolled in home economics during the 1960-61 academic year at the University of Southwestern Louisiana were randomly assigned to two sections, a control and an experimental section. Scores from an achievement test in foods and nutrition, 1 a home economics interest inventory, 2 an experience survey ${ }^{3}$ and a mental ability test ${ }^{4}$ were used to place students of the experimental section in laboratory groups. Students in the control section were chosen randomly in laboratory groups.

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Laboratory experiences for groups in the experimental section were varied in such a manner that those with less aptitude performed the simpler, less complicated tasks while the more able students worked with problems involving the use of previous learnings, more complex preparation procedures requiring greater skill, more careful management of time, and the application of basic procedures in additional variations of food products. With some lessons it was not possible to include experiences that differed too greatly. The varied laboratory activities among the groups within the class provided opportunities for students to make comparisons as to the effect of certain ingredients and methods on the finished product.

Members of the experimental section were encouraged to become more actively involved in the total teachinglearning process by assuming greater responsibility for individual achievement. This was accomplished by students demonstrating certain procedures and techniques in food preparation and by pursuing for more intensive study a subject of major interest in foods and within the ability range of the particular student.

In the control section, students were randomly assigned to groups. Laboratory activities were similar for all groups, or where it seemed important to have different activities in order to achieve specific purposes, the selection of different activities was made without regard to group abilities. Demonstrations for this section
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were given by the teacher. The students in the control section were not expected to complete a special problem of individual study as accomplished by the experimental group.

The content and presentation of subject matter in the lecture-discussion periods were kept as similar as possible for both experimental and control sections. The same general outline with major points of emphasis was followed with each section.

An alternate form of the achievement test was used with both sections and the interest inventory was repeated at the end of the course to determine gains in achievement and interest. Results were analyzed statistically to indicate differences, if any, between sections as the result of the experimental procedure.

## Importance of the Study

The problem of articulation between high school home economics courses and elementary courses in foods and nutrition at the college level has been recognized. Some efforts have been made to solve the problem without too much satisfaction.

Hackman, in a study on articulation of high school and college programs of home economics in institutions of twelve southern states, reported that such articulation was slight, that little had been done in attacking the problem, and that "some unnecessary and wasteful repetition of course material occurs in home economics courses at the
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high school and college levels, particularly in clothing construction, food preparation, and elementary nutrition."5 She also concluded that "attempts in college at placement of students on the basis of experiences and/or ability have proved unsatisfactory in most instances."6

A variety of procedures to assess student backgrounds has been used to meet the situation described above in the introductory paragraphs. Few of the foods and nutrition teachers who are concerned have been satisfied with what has been accomplished. 7

Students' backgrounds have been appraised through the use of survey sheets, personal conferences, observation of students, class discussions, and pre-tests (both written tests of knowledge and tests of application administered in food laboratories). The results from the appraisals have been used to provide for individual differences. Students have been excused from a course or a part of a course. They have been divided into different sections or provided with different kinds of experiences within a class. 8

5Ruth Akin Hackman, "Current Practices, Problems, and Opinions as They Relate to the Articulation of High School and College Programs of Home Economics" (Unpublished Doctoral thesis, University of Tennessee, 1961), p. 143.

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{ }^{6} \text { Ibid. , p. } 144
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7Dorothy L. Husseman, 'Food and Nutrition Teaching in Ferment," Journal of Home Economics, XLIX (February, 1957), 95.

8 Ibid.

Some students have received credit for the course on the basis of courses taken in high school. This practice, however, has been criticized "on the grounds that a college curriculum should be taught on such a different level from a high school curriculum that while the latter may provide a useful foundation it should not be able to substitute for the former." 9

In some instances, students with less ability than others have taken remedial courses without credit. A concentrated, one-semester course has been offered at Louisiana State University for students with greater ability, while those with less ability received the same amount of credit for two semesters ${ }^{\text {a }}$ work. ${ }^{10}$ At Cornell University students with more ability were permitted to miss laboratory sessions, but they were required to attend lectures and demonstrations. It was reported, however, that these students were usually in attendance for laboratory sessions. 11

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at various institutions in dealing with individual differences. Commercial tests have not been entirely satisfactory. Much help is needed by teachers in construction of teachermade tests. In the first place, many teachers have not had training in evaluation techniques. Tests have often included merely a recall of facts without consideration being given to understanding or application of these facts. Many times the tests have not been analyzed to test for reliability or validity.

Because of poor articulation between high school and college home economics courses, the dissatisfaction with procedures for appraising students' backgrounds, and inadequate provision for individual differences, it seemed important that this study be conducted to explore the effectiveness of (1) certain devices in evaluating students: backgrounds, and (2) one procedure in providing for individual differences of students.

In the literature concerning learning, certain generally accepted ideas appear frequently. The following statements summarized from current literature, primarily from Mort and Vincent and from Fleming supported the belief that the experimental procedures used in the present study would result in greater gains in learning than when little or no consideration was given for these factors affecting learning. Individuals differ in a variety of ways. Hereditary and environmental influences on the
physiological, psychological and sociological development account for a wide range of differences among individuals. They have different capacities for learning, different combinations of abilities or talents and will grow and learn at different rates. Learning will be more effective when emphasis is placed on the individual and when provision is made for learning opportunities suitable to each student.

Other factors also influence the learning process. Learning is increased when it begins where the students are and is related to previous knowledge and experience. Learning is enhanced when the learner is interested. Motivating interest is, therefore, an essential component of the educational process. A feeling of security or of belonging on the part of the learner is also necessary for maximum learning to take place. As learners are provided opportunities to solve their own problems and assume responsibilities for their own growth and development according to their individual abilities, then learning becomes more effective and more meaningful. 12

Grouping of students with similar abilities, backgrounds, and experiences within a heterogeneous class section and providing learning opportunities related to

[^2]the various levels of the groups should provide an atmosphere of security and belonging and relate new learnings to previous knowledge and experience. This atmosphere should be challenging to the more advanced students and yet not beyond the abilities of the beginning students. Also, allowing students to share in the teaching-learning situation and to assume individual responsibility for their own learning should bring about a greater degree of learning and development.

## Assumptions Basic to the Study

Some basic assumptions were essential in undertaking this study.

1. In a school with a small enrollment, the small number of students and limited personnel and facilities do not permit assignment of students to homogeneous class sections.
2. Students in a beginning college course often represent a wide range of ability and experience.
3. There are evaluation devices which may be used to indicate individual differences among students.
4. Foods and nutrition courses at the college level are part of the total curriculum and the program is predetermined by state and local school requirements and by the position of these courses in a sequence with other subjects.

## Hypotheses

The general hypothesis explored in the study was: More effective learning takes place when college courses in foods and nutrition are adjusted to the background experience and special interests and abilities of students than when the same experiences are provided for all students alike.

Specific hypotheses were formulated to facilitate the design of the study.

1. Students will learn more effectively if learning experiences are planned and selected in terms of individual differences.
2. More satisfactory learning will result when individuals with similar abilities and experiences are grouped together.
3. Students with more ability and previous experience will be more highly motivated if challenging activities are provided for them.
4. Other factors than previous high school homemaking courses are parts of the composite which might predict success in a foods and nutrition course.

Operational Definitions
The general hypothesis was interpreted according to certain operational definitions. More effective learning would be indicated by (1) greater gains between pre- and
post-scores on a written test including knowledge of facts and principles and the ability to apply them; (2) higher scores on a score card in applying principles in a practical situation; and (3) gains between pre- and postinterest scores in the area of foods and nutrition as indicated on the Johnson ${ }^{\text {is }}$ Interest Inventory.

Students were grouped according to previous experience and ability as indicated by a pre-test in foods and nutrition, a personal and home survey, an interest inventory and a mental ability test. Learning experiences were varied according to the levels of experience and ability with more challenging opportunities provided for those students with greater ability. Special talents of students were utilized in class demonstrations. This explained that part of the hypothesis, courses adjusted.

Background experiences as included in the study were high school homemaking courses, especially foods and nutrition units; 4-H Club activities in foods and nutrition; and home responsibilities in foods and nutrition. Information concerning these experiences was obtained through a personal and home survey form.

Scores on the Henmon-Nelson Tests of Mental Ability, the Cooperative Test in Foods and Nutrition, and the Johnson Home Economics Interest Inventory were used to determine special interests and abilities.

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Summary
The importance of this investigation was recognized in order to bring about smoother articulation between high school homemaking courses and those at the college level. The wide range of differences among students creates a necessity for individualizing instruction so that students are motivated and challenged. Opportunities should also be provided to relate new learning to previous experience and knowledge.

## CHAPTER II

SOME RECENT LITERATURE RELATED
TO THE PROBLEM

The need for concerted effort to develop and improve college curricula for students with a range of differences in backgrounds, abilities and experiences has been recognized by faculty members in many educational institutions. The literature and research on the subject are surprisingly limited in the area of foods and nutrition and few specific studies are available. There are, however, studies in the field of general education that merit careful consideration. The review of the literature in five major areas was needed in order to support this investigation: the need for better articulation between high school and college programs; the range of differences among students in elementary college courses and individualization of instruction to meet the needs of these students; grouping as a technique for instructing students with varied abilities, experiences and backgrounds; factors that might be used in determining differences among students and their value in predicting successful attainment in college courses; and specific studies concerned with ways of adjusting the college home economics program to
the range of differences of freshmen.

## Articulation

"The problem of faulty articulation has plagued educators for over fifty years."l This has been a matter of concern especially in teaching the basic foods and nutrition courses in college. College teachers in these areas have been cognizant of the fact that their students represent diverse degrees of knowledge, abilities and experiences. Reports of national conferences emphasized the importance of appraising students ${ }^{\text { }}$ backgrounds and making necessary adjustments in order to provide for individual differences and bring about a smoother transition between high school and college work. ${ }^{2}$

Hackman studied the status of articulation between high school and college home economics programs through a survey of information and opinions of college students, college home economics staff members and state supervisory staffs of home economics education in twelve southern
$1_{\text {Alvin C. Eurich and John J. Scanlon, "Articulation }}$ of Educational Units," Encyclopedia of Educational Research, Third Edition, ed. Chester W. Harris (New York: Macmillan Company, 1960), p. 89.
${ }^{2}$ Ercel Eppright, "College Teaching of Food and Nutrition," Journal of Home Economics, XLVII (October, 1955), 596; Dorothy L. Husseman, "Food and Nutrition Teaching in Ferment," Journal of Home Economics, XLIX (February, 1957), 95; Melva B. Bakkie, "Reconsidering College Teaching of Food and Nutrition," Journal of Home Economics, L (December, 1958), 760 .
states. The data supported the hypotheses that "insufficient steps have been taken toward the establishment of policies and practices for eliminating duplication occurring between the college and high school home economics programs," and that "students enrolled in the college home economics curriculum are not provided for adequately in terms of their previous experiences in home economics."3

Further conclusions from Hackman's study indicated that the usual procedure for placing college freshmen in beginning home economics did not take into consideration previous backgrounds, and that there is a great need for appropriate devices to determine the knowledge and ability of students in the various areas of home economics. ${ }^{4}$ The need, then, is evident for ways of accomplishing better articulation between high school and college home economics experiences.

## Individualizing Instruction

In order to bring about a smoother coordination between the educational experiences in the high school and in college or university courses, many college teachers concerned with the improvement of instruction in higher education recognize the range of differences of students and the need for determining the unlike qualities as a
$3^{\text {Hackman, op. cit., p. } 142 . ~}$
${ }^{4}$ Ibid., p. 144.
foundation for individualizing instruction so that each student may develop to his highest potential.

That students differ both by nature and as a result of environmental influences is an accepted fact. . . . Students learn differently, their backgrounds of experience differ, the skills and techniques they have acquired vary widely. The extent to which these differences can and should be taken into account in building and carrying out a program requires thoughtful attention by the entire staff. 5

Eckert directed attention to the need for teachers to be alert to differences of students not only in intellectual ability and background experiences but in "personality patterns and other less readily perceived characteristics."6

Social, economic, and cultural influences, interests and purposes of individuals are also factors involved in the diversity among students.

There seems to be general agreement among writers that provisions must be made for individual differences of students if an effective program of instruction is to be achieved. Unless instruction is adapted to individual needs, Eckert believes that "many students will not be challenged to their optimum level."7
${ }^{5}$ Committee for Evaluating College Programs in Home Economics, American Home Economics Association, Home Economics in Higher Education--Criteria for Evaluating Undergraduate Programs (Washington, D.C.: American Home Economics Association, 1949), p. 13.
${ }^{6}$ Ruth E. Eckert, "Improvement of College Teaching," Journal of Home Economics, XLVII (December, 1955), 731.
${ }^{7}$ Ibid., p. 731.
'Learning experiences differ according to the needs, interests, abilities and backgrounds of individual students" is one of the important criteria for evaluating college programs in home economics. 8

Clewell stated that the most important function of college teaching is that learning on the part of each individual student results. 9 In order to accomplish this she suggests the use of educational experiences "whereby each student participates according to his abilities in all phases of the learning process. ${ }^{110}$ Individualized or personalized instruction depends on determining the student's present level of development and relating new learning to previous learning and experience.

Another means of improving instruction is to place emphasis on student involvement in the learning process where the learner is provided opportunity to use initiative and to carry responsibility for educational growth according to his own ability. For individualizing instruction, Stickler suggested special reading assignments, projects,

[^3]student demonstrations, conferences, and special laboratory work. 11

Educators recognize that effective programming and instruction must rely upon knowledge about individual differences of students and adapting instruction accordingly.

Grouping of Students

The extent of diversity among students and the necessity for using many techniques to adapt instruction so that each student develops to his fullest potential suggest grouping as a possible way of solving the problem.

More writings have been concerned with grouping at the elementary and secondary rather than at the college level. However, there seemed to be no common agreement on the most effective means of grouping. A group organized as to similarity in one characteristic or closely associated characteristics might differ widely in other factors.

According to Cummins, "the extent of heterogeneity may be reduced by the careful use of multiple criteria, but there would still remain a wide diversity of interests and abilities that cannot be measured by the screening

[^4]devices we have today."l2
Della-Dora reported that "the basis of grouping needs to be directly related to the specific purposes sought. After this is accomplished, there should be changes in teaching methods suited to these purposes."13

There is also a lack of agreement on the advantages of homogeneous grouping. Buxton suggested that improvement in instruction could be achieved through ability grouping. He felt that more able students could be accelerated or given more extensive material, they could compete on their own level for marks, and they would be stimulated by students of their own level of understanding and competence. The poorer students would have a competitive chance and reduced feelings of frustration and failure. 14

Dockery found in grouping that the highest achievement was attained by the high ability group, the next by the low ability group, and the lowest in the heterogeneous group. 15

[^5]Davis reported that:
In a functioning and interacting group, pupils make greater gains in subject matter mastery under ability grouping than other grouping plans, provided that there is differentiation of the subject matter to be learned. Thus, it is that individualization of the curriculum for the variability in any group contributes more significantly to academic progress than the criterion used to comprise the group. Research in the last twenty years has not seriously challenged these conclusions. 16

On the other hand, Della-Dora believes that research implications show "no evidence of consistent or significant improvement in academic learning that can be associated with any method of grouping."17

Abramson investigated the relationship between the grouping of pupils in high school on the basis of ability and their subsequent progress in college. He found that there was no significant difference in college achievement between members of ability groups and those not grouped. The overall achievement was associated with level of intelligence rather than ability grouping. 18

College students preferred heterogeneous groups because the more able like to feel superior and poor

[^6]students do not want to be classed as members of slow sections. 19

While sectioning students according to ability may seem desirable in spite of some opinions to the contrary, Buxton doubted the advisability of doing it because of the difficulty involved in planned sectioning procedures and low correlations between ability and gains in courses. 20

An examination of the literature indicates that grouping of students has merit if certain basic ideas are apparent.

1. Criteria for grouping should be selected according to the specific purposes of the course;
2. There will be many other factors than the above criteria contributing to the range of differences of students;
3. There should be differentiation in instruction for different levels of ability;
4. Individualization of learning experiences might be more significant than criteria for grouping; and
5. More progress may be expected when students are grouped and learning experiences are adjusted to different levels.
${ }^{19}$ Buxton, op. cit., p. 344. ${ }^{20}$ Ibid.

## Factors in Determining Differences

## Among Students

Leading educational experts agree that multiple factors are involved in making one individual different from another. With some of these factors, information pertaining to a person's relative position as compared with others can be secured. Studies have been made as to the value of such information in predicting the success of students in their college curricula.

Opinions differ somewhat on the predictive value of scores on intellectual ability as a single measure. Lathrop found the scores on the American Council on Education Psychological Examination to be the best single predictor of college success in home economics for the first quarter with a correlation of .598. 21

Kimbell, in summarizing studies in prediction of academic success, also concluded that the American Council on Education Examination was the best predictor. 22 Mental tests were believed by Buxton to provide a reasonably good
${ }^{21}$ Irvin T. Lathrop, '"The Effect of High School Size and Course Pattern on Achievement in College Home Economics," Journal of Home Economics, L (December, 1958), 776.
${ }^{22}$ Fontella Thompson Kimbell, 'The Use of Selected Standardized Tests as Predictors of Academic Success at Oklahoma College for Women" (unpublished Ed. D. dissertation, University of Oklahoma, Norman, 1959), p. 17.
prediction of performance in a beginning psychology
course. 23
Studies by Shefchik, Loudenback and Wilson indicated a noticeable relationship between psychological scores and scores on written tests in foods. 24 Bloye, however, found that freshman students with similar intelligence test scores and previous training received widely differing scores in freshman college foods work. 25

Justman and Mais wrote that "intelligence is not in itself a reliable index of probable college success."26 With a correlation between a student's intelligence and achievement in college no higher than .5, they believed that it was insufficient to justify the use of intelligence alone as a predictive index.

23Buxton, op. cit., p. 341 .
24Sister Mary Bernarda Shefchik, "Initial Level of Achievement of a Group of College Students in Foods and Nutrition as Measured by Pretests" (unpublished Master ${ }^{\text { }}$ s thesis, Ohio State University, Columbus, 1956), p. 47; Margaret Louise Loudenback, 'Relation of Certain Factors in the Background of College Students to Performance on Food Pretests" (unpublished Master's thesis, Ohio State University, Columbus, 1954), p. 43; Mary Keeling Wilson, "A Study of the Achievement of College Students in Beginning Courses in Food Preparation and Serving and Related Factors" (Ph.D. dissertation, Teachers College of Columbia University, New York, 1948), published as Contributions to Education \#958 (New York: Bureau of Publications, Teachers College, Columbia University, 1949), p. 59.
${ }^{25}$ Amy I. Bloye and Alma Long, "An Experiment in Teaching Food Preparation to College Freshmen," Journal of Home Economics, XXXIII (September, 1941), 471.

26 Joseph Justman and Walter H. Mais, College Teaching: Its Practice and Potential (New York: Harper and Brothers, 1956), p. 99.

There appears to be lack of agreement concerning achievement test scores in predicting scholastic attainment in college. Cole, in comparing data from numerous studies found an average coefficient of correlation between aptitude or scholarship tests and grades to be . 55 as compared to a median of . 44 for intelligence tests. 27

Justman and Mais, and Eurich and Cain agree that scores on general achievement tests are second best to total course averages in high school as a single factor in predicting success in college. 28

Brodak found that the scores from the battery of tests in the National College Freshman Test Program were essentially of no value for predicting final grade point averages of home economics graduates at West Virginia University. However, it should be noted that this was the result of only one study as compared with summaries of many prediction studies in the book by Justman and Mais and in the article by Eurich and Cain in the Encyclopedia of Educational Research. 29
${ }^{27}$ Luella Cole, The Background for College Teaching (New York: Farrar and Rinehart, Inc., 1941), p. 293.

28 Justman and Mais, op. cit., p. 100; Alvin C. Eurich and Leo F. Cain, "Prognosis," Encyclopedia of Educational Research, First Edition, ed. Walter S. Monroe (New York: Macmillan Company, 1941), p. 849.

29Marie Brodak, "The Use of Freshman Week Test Battery for Predictive Value of Final Academic Success of Home Economics Graduates at West Virginia University--1954-1959" (unpublished Master's thesis, West Virginia University, Morgantown, 1960), p. 27.

A comprehensive preliminary test in subject matter had the most value in predicting the grade of a student after instruction in a foods class as reported by Brown. The coefficient of correlation was . 51.30

Although high school grade point averages were not used as a factor in ranking students for grouping in the present study, they have been considered important in predicting college success. Justman and Mais, and Eurich and Cain considered achievement in the total courses in high school studies the most reliable single factor. Lathrop found the high school grade point average to be second to psychological scores in importance, with a correlation of .462 between the first quarter average in college and the high school average. 31 West's study indicated that high school rank is as important as the number of years of high school home economics on achievement in college clothing. 32

The effect of previous study of a subject in high school on subsequent achievement in the same subject in college is another factor that has been given consideration. Hunter found that the average grade in a college chemistry

[^7]class for students who had had high school chemistry was 1.31 grade points higher than that of students with no previous chemistry course. 33

In a similar study in physics, Easter found that physics grades averaged . 8 of a grade point higher for those who had had physics in high school. 34

There is some evidence that the amount of and the achievement in home economics in high school does influence achievement in college home economics courses, but there are also findings to the contrary. Previous study of food preparation showed the closest relationship to achievement of students on written tests but little or no relationship on performance tests in Wilson's study. 35 West found that there seems to be a definite relationship between high school home economics and achievement in college clothing although high school rank is as important a factor as number of years of high school home economics on achievement in college clothing. 36

Little relationship between amount of high school

[^8]home economics and scores on the foods portion of a freshman orientation test was reported by Bloye. At the end of the sophomore foods course, however, those who studied home economics in high school received significantly higher average scores in laboratory techniques than those without. 37

In Brown's study, students with the maximum amount of previous home economics were poor students while those with little or no high school home economics were exceptionally good students. 38 Henkel and Seronsy concluded that "previous training as measured by a checklist bears no relation to achievement as measured by course grades."39

Super stated that "studies reviewed elsewhere have led to the conclusion that interest has a very low relationship to achievement in school or college, with such coefficients for inventories such as Strong and Kuder rarely being as high as .30." But he also reported that "more recent developments suggest that interest does play a part in achievement even though not in as direct a way as had been expected."40

37Bloye, op. cit., p. 471.
$38_{\text {Brown, op. cit., p. } 272 .}$
${ }^{39}$ Jean Henkel and Louise Baird Seronsy, 'First Course in Clothing and Textiles," Journal of Home Economics, XLIII (March, 1951), 197.

40Donald E. Super, "Interests," Encyclopedia of Educational Research, Third Edition, ed. Chester W. Harris (New York: Macmillan Company, 1960), p. 731.

While each of the above factors has value to a greater or lesser degree as single predictors of college achievement, a combination of two or more would seem desirable in organizing a class to provide for individual differences of students. Two instruments which seemed to be more favorable for predicting college achievement, a psychological test and an achievement test, were used in the current study along with an experience survey and an interest test, even though the latter two devices have not given too satisfactory results in the past.

## Home Economics Studies in Adjusting

To Individual Differences

## Of Students

Attempts have been made to adjust beginning college home economics courses, particularly foods and clothing, to previous training of students in high school, but little true research on the subject has been reported. Seronsy mentioned two studies which had been made and discarded. In the first attempt, students were sectioned on the basis of previous training in high school home economics which "failed to discriminate between successful and unsuccessful performance in college."41 The second experiment considered
${ }^{41}$ Louise Claire Baird Seronsy, "An Experimental Study of the Freshman Program in Home Economics" (Ph.D. dissertation, Purdue University, Lafayette, Indiana, 1947), p. 23. Published as Studies in Higher Education, 60 , November, 1947, by Division of Educational Reference, Purdue University.
placement of students in sections according to subject matter test scores, but scheduling problems made this impractical.

As a part of the continuing curriculum study at Purdue begun by Seronsy, an experimental study in clothing and textiles was conducted by Henkel and Seronsy. The organization of the class of approximately one hundred and seventy-five students each semester included a meeting of the entire group once a week when basic information was presented. Then subsequent meetings with thirty students or less were held to develop the basic information within the level of ability and training of the students in each group. Scores from a psychological examination, an achievement test in clothing and textiles, and an experience survey were used in assigning students to groups. The students who ranked in the upper five per cent according to scores on the home economics test and the psychological test were exempt from the beginning course and allowed to elect successive clothing and textiles courses.

The results indicated that the organization on different levels of training produced positive attitudes toward the course. However, the effect of the experimental procedure on achievement of students was not mentioned. 42

Brown reported that a three-credit elementary course in foods and a five-credit one containing similar subject

42Henkel and Seronsy, op. cit., pp. 195-197.
matter and using identical objective examinations were offered to allow for the differences among students. Those permitted to enroll in the three-credit course had scores in the highest one third on a comprehensive examination in foods, ranked above the lowest quartile in intelligence, had at least one course in high school foods, had a fair amount of home experience and had a $C$ average for the freshman year in college.

It appeared from the results that those taking the three-credit course were not handicapped. The mean letter mark in the course for the three-credit group was a B while that for the five-credit group was $\mathrm{C}+$. The mean score for the three-credit group was one standard deviation higher than for the five-credit group. In the second course the three-credit group ranked three-fourths of a standard deviation higher than the other on the final examination. 43

In the study reported by Herod, the Cooperative Test in Nutrition was used as a placement device in which freshmen students were assigned to one of two courses in nutrition, Home Economics 1 for those with little or no understanding of nutrition, and Home Economics 1A for those showing superior ability on the test. 44

43Brown, op. cit., pp. 269-270.
${ }^{44}$ Louise Neal Herod, "Nutrition Placement Tests for Entering Freshmen, Division of Home Economics, West Virginia University, 1949-1952, Inclusive" (unpublished Master's thesis, West Virginia University, Morgantown, 1953), p. 1.

Davis mentioned a similar study using the Cooperative Test in Clothing. She stated that students were exempt from the first clothing course on the basis of a high score on the test. 45 Neither Herod nor Davis indicated what score was used as the cut-off point for placement in the advanced section or exemption from the beginning course.

Neither of the suggested ways for adjusting college home economics courses to individual differences of students seems practical in a situation where the enrollment is small. For that reason, exploring the possibility of varying learning experiences within a single class section appeared to be an advisable course of action.

## Summary

Only a beginning has been made in the field of home economics in which major consideration has been directed to the adjustment of learning opportunities to the individual differences in ability, achievement, previous training, background and experience of students.

The ideas presented in the several studies gave direction to the basic elements for structuring a college program in foods and nutrition, emphasizing the need for better articulation between high school and college courses

[^9]in home economics and for individualizing instruction. Suggestions received from the literature indicated that measures of intelligence and achievement, high school grade point averages, and previous study of a subject have value in predicting achievement in college courses.

CHAPTER III

DESCRIPTION OF PROCEDURE
AND MATERIALS USED

The fact that students entering college differ widely in intellectual ability, previous training, experience, achievement, interests, and socio-economic backgrounds as well as in other less tangible ways has presented a problem to college faculty members who are concerned about instruction that will bring about the optimal learning of each individual. The problem not only takes into account the capacity of the student for learning but also previous knowledge, experience, and motivation in the area of instruction.

The concern among members of the home economics faculty at the University of Southwestern Louisiana for identifying the differences among students and adapting instruction accordingly prompted the present study.

## The Problem

The relatively small enrollment in home economics, one hundred and thirty majors during the year 1960-61 when the study was undertaken, and limited facilities and staff, prevented sectioning of students according to ability,
previous training and experience. The curriculum required that all home economics majors be enrolled in the beginning foods and nutrition course regardless of previous training. There was a question among faculty as to what means should be used in evaluating a student's readiness for advanced level work if the situation had permitted exemption of a student with a strong background of preparation from a basic course and placement in an advanced course.

An experimental study was made to explore the effectiveness of adjusting learning experiences to individual differences of students within a heterogeneous class section on their gains in the course and to determine criteria for grouping within a single class section.

Freshman students enrolled in the beginning foods and nutrition course at the University of Southwestern Louisiana during the year 1960-61 participated in the study. Random assignment to fall or spring sections was made by each student drawing a tag designating the section to which she was assigned. This was done at the fall registration.

A toss of a coin determined that the fall class would be the experimental section and the spring class the control section. Some students were included in both fall and spring classes who could not be assigned randomly because they were repeating the course or were transfer students who had to be assigned at a particular time. These students participated in the same manner as the others but data concerning them were not used in the study.

There were nineteen in the control section and twenty in the experimental section who participated in the study.

Experimental Variables

The course content in the lecture and discussion sessions for both the experimental and control sections was kept as similar as possible. Weekly assignments were also the same for both sections.

Throughout the laboratory, lecture and discussion lessons, basic principles of nutrition and food preparation were stressed. At the same time emphasis was also placed upon standards to be expected in a product, nutritive value and its retention, variety, and attractive service. Students were helped to recognize the importance of the food products prepared as parts of separate meals and of the daily diet.

With limited laboratory facilities and only one foods class being taught a semester, it was necessary to instruct one section of twenty-eight students in the fall semester and a section of thirty students in the spring. The writer was responsible for the lecture period for the entire group and a large laboratory section each semester. A second teacher assisted by giving supervision to the smaller laboratory section. All laboratory work was planned and evaluated for both sections in order to avoid differences in learning experiences because of different sizes in laboratory sections or different teachers in charge.

Students in the experimental section were grouped according to levels of ability, achievement, experience and interest as determined by scores on a mental ability test, ${ }^{1}$ a test on foods and nutrition subject matter, ${ }^{2}$ an interest inventory, ${ }^{3}$ and a survey of experiences in foods and nutrition ${ }^{4}$ constructed by the writer. Varied laboratory experiences were provided for the different group levels ranging from the simple to the more complex tasks. The advanced students prepared products which involved the use of previous learning, more complex preparation procedures, greater skill in food preparation techniques, and more careful management of time. They also had the opportunity to apply basic principles in preparing variations of food products. With some lessons it was not possible to include experiences that differed too greatly. In fact, for the purposes of some particular lessons, it was necessary to keep the activities of different groups as similar as possible. The least qualified students, on the other hand, worked with simple, basic recipes that were within their range of ability.

The varied laboratory experiences provided students with an opportunity to compare the effect of certain

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\(\mathrm{l}_{\text {Henmon }}\) and Nelson, op. cit. \({ }^{2}\) Segner et al., op. cit.
\(3_{\text {Johnson, }}\) op. cit.
\({ }^{4}\) Appendix A.
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ingredients and methods of preparation on the finished product. For example, in one of the vegetable lessons the advanced groups worked with products involving more preparation procedures which in some instances drew on previous high school training (i.e. making white sauce for corn pudding and scalloped potatoes). Also those experiences requiring more time were given to the advanced groups, assuming that they could work more quickly than the less qualified students.

Additional illustrations showing different levels of experiences for the groups may be found in the syllabus in the Appendix. ${ }^{5}$

Perhaps a greater advantage from the grouping of students with similar abilities was that all within the group would participate on an equal basis rather than that an advanced student would take over and not allow the less qualified student to share in the activities.

Students in the experimental section had an opportunity to become more actively involved in the learning situation by being responsible for class demonstrations to illustrate accepted techniques in food preparation. Examples of the demonstrations included procedures for making biscuits, kneading and shaping rolls, and for cooking eggs. Other examples are reported in the syllabus. ${ }^{6}$

[^10]Two students planned and presented each demonstration.
A third way was used to individualize instruction in the experimental section. Students were encouraged to pursue a problem in foods of special interest to them. It was suggested that they read widely on their selected subject, and/or experiment, test, or evaluate proportions or procedures in recipes in terms of generally accepted facts or principles. The selection of the problem was left to the individual student. One student made a collection of family recipes which she tested and revised in terms of standard measurements and accepted preparation procedures. Each recipe included a brief description of the origin or source and the appropriate family occasions when the food would be served.

Another girl chose rice as a topic for study and in the opinion of the writer did a very thorough and complete research paper including information on the importance of rice in the diet, preparation, and recipes for using it. Rice was one of the main agricultural products of the area and was a very important item in family diets.

Some of the less satisfactory projects included brief reports on the subject with a single source as reference, or simple collections of recipes. Other topics chosen for study are listed in the Appendix. 7

Students in the control section were randomly

[^11]T
assigned to groups by drawing numbered tags. Laboratory experiences were the same or closely similar for all groups, except when it was important to have different activities to achieve specific purposes of the particular lesson. These students did not assume any responsibilities for class instruction, nor did they undertake any special problem. The same demonstrations were presented in the control section as in the experimental section, but the teacher rather than students was responsible.

## Materials Used

An achievement test on foods and nutrition subject matter, a test of mental ability, an interest inventory and a survey of experiences in foods and nutrition were used to obtain information about each student.

The Cooperative Tests in Foods and Nutrition, Form $Y$ was administered as a pre-test at the beginning of the course for each section, and the alternate Form $X$ was used at the completion of the course.

This test was prepared by members of a special subcommittee of the American Home Economics Association Evaluation Committee, who are recognized leaders in home economics, with the cooperation of the Educational Testing Service staff members. It was used as a part of the National College Home Economics Testing Program in 1950. Norms were established on the basis of 2510 students from ninety-one colleges who took the test. The report of the
testing program suggested the use of the instrument for evaluating previous home economics training, placement purposes and evaluating experimental programs. 8

No information was available from the Educational Testing Service on the reliability or validity of the test. However, in a study by Simons, a coefficient of reliability of .77 was obtained by the split-half technique. 9 Items on foods were separated from nutrition items. Correlations between the foods portion and foods grade for freshmen were .44; for sophomores and juniors, . 50; and for seniors, .55. Correlations between the nutrition part and nutrition grade were . 55 for sophomores and juniors and .33 for seniors. These data indicated a moderate degree of validity for the entire test.

The Gooperative Tests on Foods and Nutrition appeared to be satisfactory for determining the range of achievement of students and for judging the adequacy of the course for meeting needs of students, according to Shefchik. 10 Herod found that it had definite predictive value for placing students in foods and nutrition classes. 11

[^12]Since there were so few tests of this type available in home economics and since this particular test has been used satisfactorily for purposes similar to those in this study, it seemed appropriate to use the Cooperative Test on Foods and Nutrition.

The plan of the study included intellectual ability as one of the factors to be used in grouping students with similar qualifications and to make certain that the experimental section and control section were similar in scholastic ability. The college level Henmon-Nelson Tests of Mental Ability, Form A, was administered as a part of the battery of examinations for all freshmen at the University. The scores were used as a part of the data in this study.

The Henmon-Nelson Tests were designed to measure aptitude of students for college work and to give some indication of the probable success of students in college. Correlations as reported by Henmon and Nelson ranged from .68 to . 79 between the Henmon-Nelson Tests and other psychological examinations such as the American Council on Education Psychological Examination and the Otis SelfAdministering Tests of Mental Ability, indicating the validity of the Henmon-Nelson Tests. A coefficient of reliability of .89 was also reported by the authors of the test.

The measure of students: interests was included as a means for determining the extent to which interest
predicted success in a beginning foods and nutrition course. The Johnson Home Economics Interest Inventory was used for this purpose although the investigator was aware of the fact that the inventory would not measure adequately the interests as defined in the study, since it was keyed for home economics occupations rather than specific areas of home economics, such as foods, nutrition, clothing, etc. 12 However, it was thought that there might be some relationship between those occupations which were in the foods and nutrition area and a student's interest in foods and nutrition. The occupations in the foods and nutrition areas are food product promotion, food service directing, hospital dietetics, and restaurant or tea room management.

The inventory is divided into two parts. Part A has a list of one hundred fifty-three activities and responsibilities of women employed in home economics positions. The respondent indicates his reaction to each item according to a degree of value scale. Part $B$ includes characteristics of various home economics positions. Such items as, "Help individuals of all classes with their personal dietary problems," or "Develop new recipes in a test kitchen," or "Plan menus which will attract customers" are examples that would indicate an interest in working with foods. 13

[^13]The interest inventory was used a second time at the completion of the course to note gains in interest as a result of the experiences in the course.

The 'Foods and Nutrition Interest Check List' which related specifically to the objectives for the course was developed by the investigator. 14 Upon completion of the course students indicated on a five-point scale the degree to which each experience in the foods and nutrition area affected their interest in the subject. Scores for the checklist were derived by assigning a value of +2 for "increased interest greatly," +1 for "increased interest slightly," 0 for "neither increased nor decreased interest," -1 for "decreased interest slightly," and -2 for "decreased interest greatly."

A fourth device used at the beginning of the term to obtain information about the students was a survey form, "Student Experiences in Foods and Nutrition."15 The items asked for personal and family information as well as information about the amounts and kinds of experiences the respondent had had in foods and nutrition work in high school home economics courses, in 4-H Club activities, and as a part of her home responsibilities.

Numerical values were established to obtain a total score for experiences. For example, 10 points were allowed

[^14]for each year of high school home economics, and 0-3 points for the extent of emphasis on each activity from no experience to much experience. These values are indicated on the survey form in the Appendix.

A 'Rating Sheet for Laboratory Work in Food Preparation" which had been used successfully in the Home Economics Department at Southwestern for some years evaluated laboratory techniques. ${ }^{16}$ The original source of this rating sheet is not certain. It is set up on a ten-point scale with three levels of behavior described for each item listed.

The scores on each of the four instruments used at the beginning, Cooperative Test in Foods and Nutrition, Henmon-Nelson Tests of Mental Ability, Johnson Home Economics Interest Inventory, and the experience survey, were arranged in rank order. The rank positions for the four devices were totaled for each student. The totals were then arranged in rank order. ${ }^{17}$ This procedure was a means for illustrating positional rank when the four tests were used for comparison purposes. It is probable that the computations of standard scores for each of the tests would have given a better indication of the total positional ranks of the respondents. Students with similar qualifications according to rank positions were assigned to
$16_{\text {Appendix }}$ A.
$17_{\text {Appendix }}$.
groups of four within a unit-arranged kitchen.

## The Situation in Which Study Was Conducted

The University of Southwestern Louisiana is a statesupported institution of higher learning which had an enrollment of approximately five thousand at the time this study was conducted. There were one hundred and thirty home economics majors enrolled, fifty-one of whom were freshmen. There were ten members of the home economics faculty, two of whom were dietitians who taught classes on a part-time basis.

Home economics curricula were offered in vocational home economics education, institutional management, home economics in business, and general home economics. The majority of students were enrolled in the vocational home economics education program.

The objectives of the home economics curricula were directed toward developing competences in the various areas of home economics to meet the particular needs in the home economics professions, especially education.

The beginning foods and nutrition course was taught in the freshman year without prerequisites of chemistry or nutrition which made it necessary to keep the instruction at a more elementary level than if chemistry or nutrition had preceded the course.

Scheduling procedures made it necessary to offer one section of the foods and nutrition course each semester. Thus a variable in time was introduced which could have affected the results in the study.

## The Sample

The sample included all freshmen enrolled during the 1960-61 school year who could be randomly assigned to the two sections of the experiment. The number of participants was twenty in the experimental section and nineteen in the control section, or a total of thirty-nine.

The limited number in the sample would prevent any definite conclusions being drawn from the findings. However, the results might give some implications as to ways of meeting the problem in situations similar to the one in which the study was conducted.

## Summary

An experimental study was conducted to explore a way of adjusting learning experiences to individual differences of students in a beginning foods and nutrition course.

Students were randomly assigned to the experimental or the control section. A mental ability test, a foods and nutrition achievement test, an interest inventory, and an experience survey were used to group members with similar qualifications in the experimental section. Students in the control section were randomly assigned to
groups. Course content as presented in lecture and discussion sections was as nearly as possible the same for both sections. Students in the experimental section had laboratory experiences varied according to the different levels of ability, interest, achievement, and background experiences. They were also responsible for class demonstrations and for special term problems which were not required of students in the control section.

Following the course, an alternate form of the foods and nutrition test was administered, and the interest inventory repeated to determine gains in achievement and interest as the result of the experimental versus control procedures.

## CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The data were analyzed statistically for the purposes of comparing the experimental and control sections at the beginning of the study, for ascertaining gains in achievement and interest as the result of the experimental teaching procedure, and for discovering which of the instruments used would best predict success in the course.

## Comparison of Experimental and Control Sections at Beginning of Study

A random selection of the sample was necessary for inferences to be reliable and valid. Students were randomly assigned to the experimental or control section. Each individual had an equal chance to be in either section and theoretically there should have been no difference between the means of the two sections. To test this hypothesis that there was no difference, the student's "t" test was used with data for each section from the four instruments administered.

On the Henmon-Nelson Tests of Mental Ability, the mean score for the control group (39.21) as shown in Table l, was slightly higher than that of the experimental
Table 1. Comparison of the Two Sections on

| Factor | Control |  | Experimental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Mean | Standard Deviation | Mean | Standard Deviation | "t" |
| ```Mental (Henmon-Nelson)``` | 39.21 | 8.78 | 38.50 | 10.69 | $.23^{\text {a }}$ |
| Achievement (Cooperative Test in Foods and Nutrition) | 32.03 | 10.16 | 31.51 | 10.46 | $.157^{\text {a }}$ |
| ```Interest (Johnson's Home Economics Interest Inventory)``` | 1157.36 | 50.23 | 1137.15 | 37.32 | $1.42{ }^{\text {a }}$ |
| Experience in Foods and Nutrition (Experience Survey) | 84.73 | 30.50 | 82.60 | 28.61 | $.225^{\text {a }}$ |

aFor 37 degrees of freedom, an obtained "t" of 2.026 indicates
significance at the five per cent level.
group (38.50). The obtained "t" of the difference of the two means was . 23. To be significant at the five per cent level, a "t" value of 2.026 would be necessary with 37 degrees of freedom. The five per cent level of significance means that only five times out of a hundred would a difference equal to 2.026 or greater occur by chance. A difference of .23 could occur 82 times in 100 comparisons of similar groups by chance alone. Accordingly, the null hypothesis was retained that there was no real difference between the groups.

The mean scores for both groups were approximately the same as the seventy-seventh percentile of the University of Southwestern Louisiana norms for the HenmonNelson Tests, indicating that these home economics freshmen as a group were above the average for freshmen enrolled at Southwestern.

The control group with a mean of 32.03 scored slightly higher on the Cooperative Test in Foods and Nutrition as compared with a mean of 31.51 for the experimental group. The "t" value of . 157 was not significant.

Scores on the survey of "Student Experiences in Foods and Nutrition" indicated a close similarity between groups. A mean of 84.73 for the control group, 82.60 for the experimental group, and an obtained "t" of . 225 were derived from the statistical calculation.

Similar results were evident from the scores pertaining to foods and nutrition occupations on the Johnson

Home Economics Interest Inventory. A mean of 1157.36 for the control group was again slightly higher than the mean of 1137.15 for the experimental group. The "t" value of 1.42 was not significant.

There was no significant difference between the experimental and control groups on the four measures of intelligence, achievement, experience and interest. Therefore, the null hypothesis was accepted that based on the evidence provided there was no real difference between the two groups. Findings showed that the samples were representative of freshmen students enrolled in home economics in this situation, and results obtained can be inferred as typical of others in the same or similar situations.

## Personal and Family Information

The survey "Student Experiences in Foods and Nutrition" included information other than that mentioned previously about the individual and her family which also verified the similarity between the sections. Approximately fifty-seven per cent of the students in each section were from rural homes. The average size of the families was similar for the two sections, namely 5.82 as compared with the average of 3.65 for families in the United States reported in the 1960 census. About one fourth of the mothers of these girls worked outside the home.

The educational level attained by the mothers was slightly below that of the fathers. Nearly two thirds of
the mothers had a high school education or less while only one half of the fathers were in this same category.

About sixteen per cent of the students in the control section and ten per cent in the experimental section had no previous home economics in high school. Eighty per cent in both sections had two years or more.

Less than half of the students had organized home experiences in the foods and nutrition areas as a part of their high school home economics program. About threefourths of each group had participated in 4-H Club activities. The control group reported more of this type of experience than the experimental group. Slightly more than one-fourth of the students in the two groups combined had more than six years in 4-H Club work.

Both groups reported similar degrees of emphasis on various aspects of their foods and nutrition work in high school. Greater emphasis was reported on table setting and service, measuring ingredients, using and caring for equipment, understanding and using recipes, and preparing baked products. Less emphasis was on food preservation, experiences with new food products, knowledge and use of nutritive values, new methods of preparation, and selection and buying of foods.

The types of activities in which students participated most frequently at home included table setting and preparation of salads, desserts, baked products and vegetables. Responsibilities with least experience at home
were food preservation, use of knowledge of nutritive value, new methods of food preparation, and use of new food products.

Reasons listed most frequently for activities with foods at home included liking to make food attractive, trying new recipes, and accepting definite responsibilities as a share of family activities.

Results from the personal and family data sheets had implications for the high school program as well as the college courses in foods and nutrition. There appeared a definite need for emphasis on nutritional, managerial, and consumer aspects of foods, and on sociological, economic and technological trends as they pertain to foods and nutrition.

Comparison of Experimental and Control
Sections Following Study

An alternate form of the Cooperative Test in Foods and Nutrition was administered at the end of the course. Raw scores for both forms were changed to standard scores and the difference between the scores calculated for each individual. The mean of the difference scores as shown in Table 2 indicated greater gains for the experimental section (15.16) than for the control section (12.56), while the order was reversed at the beginning. It would seem that the experimental procedure could have had an effect on the progress in achievement as measured by the
Table 2. Comparison of the Two Sections

| Factor | Control |  | Experimental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Mean Difference Score | Standard Deviation | Mean Difference Score | Standard Deviation | "t" |
| Achievement (Cooperative Test in Foods and Nutrition) | 12.56 | 7.04 | 15.16 | 8.81 | $1.024^{\text {a }}$ |
| Interest <br> (Johnson's Home Economics Interest Inventory) | 4.58 | 37.15 | -6.6 | 40.31 | $.901^{\text {a }}$ |

aFor 37 degrees of freedom, an obtained "t" of 2.026 indicates
significance at the five per cent level.

Cooperative Test. However, the "t" value of the difference between the two means (1.024) was not significant.

One factor was evident which might possibly explain the small differences. Because of existing circumstances, it was necessary to teach one section in the fall semester and the second in the spring. The fall section, designated randomly by a coin-toss as the experimental one, was undergoing an adjustment to college activities and a different process of educational instruction. The period of adaptation may have made a difference since the spring, or control, section had the benefit of this experience before taking the course.

When the Johnson Home Economics Interest Inventory was administered the second time following the course to determine the effect of the experimental procedures on the interests of students, the mean difference score for the control group was higher (4.58) than for the experimental group (-6.6). The difference was not significant, however, with a "t" of .901.

Negative difference scores resulted among approximately half of the students in the experimental group and one-third of the control group. These scores were scattered through all levels of ability and were not typical of students at the lower level of ability or achievement. The above results were contrary to what might have been expected when techniques of motivation had been particularly emphasized.

Rachut reported that approximately one-fourth of the respondents in her study of the stability of the Johnson Home Economics Interest Inventory scores decreased or raised their scores less than three standard score points from the freshman to the senior level. Perhaps, then, the decrease in scores obtained in the present study was not too unusual. ${ }^{1}$

The average gains on achievement and interest for those students in the upper third and in the lower third of each section were compared. It was expected that the less qualified students would be more successful as shown by gains on the Cooperative Test and the better qualified more challenged as indicated by the gains on the interest inventory when the experimental procedure was followed. The data summarized in Table 3 indicates that greater gains on the Cooperative Test were achieved by the lower third in the experimental section than by the lower group in the control section, a mean difference of 7.1 standard score points. In the upper third, the experimental section also made greater gains than the control, but this mean difference of 1.4 points was only slight.

The upper third in the experimental section made greater gains than the control section on the Johnsons

[^15]Table 3. Comparison of Average Gains in Achievement

|  | Average Gains <br> on Cooperative Test |  | Average Gains <br> on JHEII |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| ControlExperi- <br> mental | Difference | ControlExperi- <br> mental | Difference |  |  |
| Middle third | 11.3 | 9.3 | -2 | -1.5 | 4.7 |
| Lower third | 13.8 | 20.9 | 7.1 | 18.6 | -17 |

Interest Inventory with a mean difference score of 6.2 points. There was also a noticeable difference of 13.7 points between the lower third and the upper third of the experimental section as contrasted with 4.16 for the control section.

The 'Foods and Nutrition Check List" provided additional information on the degree to which experiences in the course affected interest. In both sections a greater degree of interest was indicated on the items pertaining to the actual preparation of foods (Table 4). Less interest was shown in the areas of nutrition, individual study of reference materials to solve problems in foods and nutrition, use of equipment, recognition of achievement, and management. The activities designed to permit students to explore beyond basic class experiences on their individual levels of interest and ability were rated low rather than being the most stimulating items.

Differences between the groups indicated from the interest check list were not significant but development of interest was in a positive direction (Table 5). A comparison of scores on the 'Rating Sheet for Laboratory Work in Food Preparation" also revealed no significant differences for the two groups.

## Correlations

The preceding comparisons of the experimental and control sections were based on a single variable at a time.

Table 4. Effect of Experiences on Increase of Interest (In Rank Order)

| Rank <br> Position | Item Number | Item |
| :---: | :---: | :---: |
| 1 | 2. | Preparing foods in ways that are different from the ways to which you have been accustomed. |
| 2 | 1. | Preparing a single food in a variety of ways. |
| 4.5 | 11. | Using combinations of foods that make them more appealing in appearance and flavor. (Pork chops with fried apple rings, ham with pineapple and yams). |
| 4.5 | 17. | Applying ideas, knowledge and abilities gained from the course in food preparation and meal service at home. |
| 5 | 24. | Using personal initiative or creative ability in preparing and serving attractive, tasty, nourishing food. |
| 6 | 12. | Using local food products in various ways. (Rice, yams). |
| 7 | 22. | Understanding and using basic principles in food preparation. (Starch cookery, emulsions, sugar cookery, protein cookery, etc.). |
| 8 | 10. | Using appropriate garnishes to make food more attractive in appearance. |
| 9 | 7. | Comparing different methods of preparation and their resulting products. (Dry heat vs. moist heat for meats, quick mix method vs. conventional for cakes.) |

Table 4 (Continued)

| Rank <br> Position | Item Number | Item |
| :---: | :---: | :---: |
| 11.5 | 5. | Learning to like foods that are unusual or prepared in unusual ways. |
| 11.5 | 15. | Observing demonstrations on food preparation techniques. |
| 12 | 3. | Preparing dishes typical of this area with its French and Spanish influence in food preparation-gumbo, rice dressing, dishes for fast days. |
| 14.5 | 16. | Using knowledge of nutrition in improving personal eating habits to meet recommended nutritional requirements. |
| 14.5 | 6. | Judging foods according to accepted standards in order to understand why certain results are obtained in the final product. |
| 16.5 | 8. | Observing the effect of different ingredients on the product obtained. (Tenderizer on meat, sugar on fruits, increase or decrease of fat and/or sugar on baked products, acid or alkaline reaction on color pigments in vegetables). |
| 16.5 | 20. | Managing the use of time and energy in the laboratory in order to keep on schedule. |
| 17 | 9. | Comparing new food products with traditional ones. (Precooked rice, instant potatoes, bread or cake mixes). |

Table 4 (Continued)

| $\begin{aligned} & \hline \hline \text { Rank } \\ & \text { Position } \end{aligned}$ | Item Number | Experience |
| :---: | :---: | :---: |
| 18 | 21. | Assuming personal responsibility in keeping the unit kitchen in order. |
| 19 | 4. | Preparing foods that are different from those to which you are accustomed (avocado, acorn squash, broccoli, brussel sprouts). |
| 20 | 19. | Organizing responsibilities within the group so that each person shares in all the activities. |
| 21 | 23. | Recognizing (or being recognized for) personal achievement in food preparation. |
| 22 | 13. | Using various types of small and large food preparation equipment (including automatic equipment). |
| 24.5 | 25. | Using a variety of reference materials, books and magazines-related to foods and nutrition. |
| 24.5 | 26. | Using individual study to solve problems relating to nutrition and food study. |
| 25 | 18. | Discussing current nutritional problems and ways they might be overcome. |

Table 4 (Continued)

| Rank <br> Position | Item <br> Number | Experience |
| :--- | :--- | :--- |
| 26 | 14. | Observing demonstrations on the <br> use of ranges and other equipment. |

Table 5. Comparis on of the Two Sections on the "Interest Check List" and "Rating Sheet for Laboratory Work"

| Factor | Control |  | Experimental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Mean | Standard Deviation | Mean | Standard Deviation | "t" |
| Foods and Nutrition Interest Check List | 33.26 | 8.431 | 32.65 | 11.36 | $.19^{\text {a }}$ |
| Rating Sheet for Laboratory Work | 72.20 | 8.16 | 69.35 | 8.156 | $1.09^{\text {a }}$ |

Certain abilities may be closely related while others are comparatively independent. When a close relationship exists between two variables, performance in one may give an indication of the probable achievement in the other.

To establish the degree of relationship between the abilities measured by the various instruments used in the study, coefficients of correlation ( $r$ ) were computed for the control and experimental sections separately and together.

A high degree of correlation (.736) significant at the one per cent level was found between the "before" and "after" scores of the Cooperative Test for the control section, and only a moderate relationship (.412) between the two for the experimental section. These are shown in Table 6.

Correlations for both sections between the "after" scores for the Gooperative Test and the "Experience Survey" scores were significant at the five per cent level of confidence, with $r$ equal to .569 for the control section and .497 for the experimental section.

The correlation between the "after score" of the Cooperative Test and the Johnson Interest Inventory was fairly high (.583), significant at the one per cent level for the control section and negligible for the experimental section (.095). On the other hand, a significant relationship (.542) was evident for the experimental section between the "before scores" of the Cooperative Test and the

# Table 6. Coefficients of Correlation Between Factors Studied-Control and Experimental Sections 

|  |  | T1 | T2 | T3 | T4 | T5 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| T1 | After Score-Cooperative Test | -- | $.736{ }^{\text {b }}$ | . 318 | . $569{ }^{\text {a }}$ | $.583^{\text {b }}$ |
| T2 | Before Score-Cooperative Test | . 412 | -- | . 157 | . $494{ }^{\text {a }}$ | . 351 |
| T3 | Henmon-Nelson | . 386 | $.542^{\text {a }}$ | -- | . 023 | . 385 |
| T4 | Experience Survey | .497a | $.513^{\text {a }}$ | . 111 | - | . 077 |
| T5 | Johns on Interest Inventory (Before) | . 095 | . 089 | . 388 | . 084 | -- |

With 17 degrees of freedom to be significant at the five per cent level, $r$ should be .456 and with 18 degrees, r should be .444.
$b_{\text {To }}$ be significant at the one per cent level, $r$ should be . 575 with 17 degrees of freedom and .561 with 18 degrees.

Note: Correlations for the control section are on the right of the diagonal and for the experimental section, on the left.

Henmon-Nelson scores, and a low one (.157) for the control section.
"Before scores" of the Cooperative Test and the 'Experience Survey" scores had a correlation significant at the five per cent level for both sections (. 494 for control; . 513 for experimental).

Negligible correlations between the Henmon-Nelson scores and the "Experience Survey" scores were evident for both sections. The correlation between Henmon-Nelson scores and "after scores" on the Cooperative Test was low.

Except for the correlation between the "after scores" on the Cooperative Test and the Johnson Interest Inventory mentioned previously for the control section, a correlation between the Johnson Inventory and any of the other instruments was negligible or low.

To ascertain the extent to which any of the instruments used had value for predicting success in a beginning foods and nutrition course, the scores on each instrument were combined for the two sections, and the data interpreted for a total sample of thirty-nine rather than the two separate samples of twenty and nineteen. Using the "after scores" for the Cooperative Test as a criterion for judging success in the course, correlations between these scores and other scores were computed.

The data presented in Table 7 show that correlations significant at the one per cent level were obtained between the "before" and "after scores" of the Cooperative Test,

## Table 7. Coefficients of Correlation Total Scores for Both Groups

|  |  | T1 | T2 | T3 | T4 | T5 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| After Score-Cooperative Test | T1 | -- | $.583^{\text {b }}$ | $.352^{\text {a }}$ | $.544^{\text {b }}$ | $.395^{\text {a }}$ |
| Before Score-Cooperative Test |  | -- | -- | $.390^{\text {a }}$ | $.517^{\text {b }}$ | . 228 |
| Henmon-Nelson | T3 | -- | -- | -- | . 072 | $.375{ }^{\text {a }}$ |
| Experience Survey | T4 | -- | -- | -- | -- | . 079 |
| Johnson Interest Inventory | T5 | -- | -- | -- | -- | -- |

${ }^{a_{A}}$ correlation of .308 indicates significance at the five per cent level.
$\mathrm{b}_{\mathrm{A}}$ correlation of . 398 or above indicates significance at the one per cent level.
between the "after scores" of the Cooperative Test and the experience survey, and between the "before score" of the Cooperative Test and the experience survey. Correlations significant at the five per cent level were found between the "after score" of the Cooperative Test and the HenmonNelson Tests, between the "after score" of the Cooperative Test and the Johnson Home Economics Interest Inventory, between the "before score" of the Cooperative Test and the Henmon-Nelson Tests, and between the Henmon-Nelson Tests and the Interest Inventory. Negligible correlations were evident between the Henmon-Nelson Tests and the experience survey and between the experience survey and the Interest Inventory.

The proportion of variance in one factor which is predictable from or attributable to the variation in another factor can be estimated by squaring the coefficient of correlation ( $r^{2}$ ). ${ }^{2}$ Also, through partial correlation the influence of factors other than the two being considered may be ruled out. ${ }^{3}$

Thirty-four per cent of the correlation between the "before" and "after scores" of the Cooperative Test can be attributed to the interaction of these two factors (Table 8). The scores on the experience survey showed more influence

QQuinn McNemar, Psychological Statistics, 2nd ed. revised (New York: John Wiley and Sons, Inc., I955), p. 139.
$3^{\text {Ibid. }}$. P .166 .

Table 8. Correlations Without Influence of Other Factors

| Without Influence of: |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | T1 | T2 | T3 | T4 | T5 | $r^{2}$ |
| $\mathrm{T}_{1} \mathrm{~T}_{2}$ | . 583 | -- | -- | . 517 | . 420 | . 551 | . 34 |
| $\mathrm{T}_{1} \mathrm{~T}_{3}$ | . 352 | -- | . 166 | -- | . 374 | . 239 | . 12 |
| $\mathrm{T}_{1} \mathrm{~T}_{4}$ | . 544 | -- | . 349 | . 556 | -- | . 560 | . 30 |
| $\mathrm{T}_{1} \mathrm{~T}_{5}$ | . 395 | -- | . 330 | . 303 | . 420 | -- | . 16 |
| $\mathrm{T}_{2} \mathrm{~T}_{3}$ | . 390 | . 243 | -- | -- | .413 | . 337 | . 15 |
| $\mathrm{T}_{2} \mathrm{~T}_{4}$ | . 517 | . 293 | -- | . 532 | -- | . 514 | . 27 |
| $\mathrm{T}_{3} \mathrm{~T}_{5}$ | . 375 | . 277 | . 319 | -- | . 372 | -- | . 14 |

$\mathrm{T}_{1}$ "After Score"--Cooperative Test
$\mathrm{T}_{2}$ "Before Score"--Cooperative Test
$\mathrm{T}_{3}$ Henmon-Nelson
$\mathrm{T}_{4}$ Experience Survey
$\mathrm{T}_{5}$ Johnson Home Economics Interest Inventory
$r^{2}$ Proportion of variance in one factor attributable to the other factor
on the relationship than the Henmon-Nelson rating, which was next in order of influence, or the Johnson Interest Inventory.

About thirty per cent of the relationship between the "after scores" on the Cooperative Test and the experience survey is common to both factors. The "before score" on the Cooperative Test was the factor most responsible for the correlation. The Henmon-Nelson and Johnson Interest Inventory scores appeared to have had little or no influence.

The "before scores" on the Cooperative Test and the "Experience" ratings correlated high (.517-- significant at the one per cent level). These two factors are responsible for approximately twenty-seven per cent of the relationship. The correlation was influenced very little, if any, by either the Henmon-Nelson or Johnson Inventory scores. With a close relationship between the "before scores" of the Cooperative Test and "Experience," and with the scores from each of these instruments closely related to the "after scores" of the Cooperative Test, the two seemed to be predictive of what the students might do in the course. There was a correlation of .395 , significant at the five per cent level, between the Cooperative Test "after scores" and the Johnson Home. Economics Interest Inventory scores. About sixteen per cent of the relationship can be attributed to the two instruments. The Henmon-Nelson scores had more influence on the correlation between the
two than the "before scores" of the Cooperative Test or the "experience" scores.

A correlation of .352 , also significant at the five per cent level of confidence, was found between the "after scores" of the Cooperative Test and Henmon-Nelson scores. About twelve per cent of this relationship is due to these two instruments. The "before" Cooperative Test scores showed the most influence on this relationship with the Johnson Interest Inventory next in degree of influence.

The Henmon-Nelson scores and the Johnson Interest Inventory scores showed a relationship of . 375, with about fourteen per cent due to the two factors. The "after scores" on the Cooperative Test reflected the greatest influence on the correlation, with the "Experience Survey" showing very little influence.

A correlation of . 390 existed between the "before scores" of the Cooperative Test and the Henmon-Nelson scores. Fifteen per cent of the relationship can be attributed to the two factors. The Johnson Interest Inventory seemed to have the most influence on the correlation. The "Experience Survey" had little or no influence.

The "before scores" of the Cooperative Test and the "Experience" scores showed higher correlation with the "after scores" of the Cooperative Test, and neither of these was influenced to any great degree by either the HenmonNelson or Johnson Interest Inventory scores. Significant correlation was evident between the "after scores" of the

Cooperative Test and Henmon-Nelson scores and Johnson Inventory scores, and each seemed to influence the correlation of the other with the "after" Cooperative Test scores. The interrelationship among the above tests would seem to indicate that interest and mental ability are important factors as well as achievement and experience in the total situation. Also, the relationship between experience and intellectual ability or interest was negligible.

The literature supported the premise that varying degrees of reliability existed on the value of either achievement or intelligence as a single predictive device for success in college, and rated them both high as indcaters of success. It was mentioned that a combination of measures rather than a single one was more valid as a means for prediction.

West found a definite relationship between the amount of high school homemaking and achievement in college clothing. 4 Results from this study indicate that the amount of previous experience which included high school homemaking also has a definite relationship to success in foods and nutrition in college.

Johnson stated, "It is not assumed that an interest inventory may be used to measure aptitude as well as

West, op. cit., p. 32.
interest."5 She also stated, "Since relationship between vocational interest and intelligence is slight, neither can be predicted from the other." 6

The present study showed opposite results with significant correlations between the Interest Inventory and intelligence and achievement scores.

## Demonstrations and Special Projects

Students in the experimental section had the opportunity to participate more actively in the teachinglearning situation through special demonstrations and individual projects.

The demonstrations were planned to concur with specific laboratory lessons. A list of these according to the total rank positions of the students will be found in the Appendix, along with a copy of the score sheet by which the demonstrations were evaluated. 7 The appearance, manner and speech of the demonstrator, her preparation for the presentation, the completeness and accuracy of the information, and the manner in which the activity was executed were factors considered in judging the demonstration.

The responsibility was enthusiastically and

5 Johnson, op. cit., p. 25.
${ }^{6}$ Ibid., p. 29 .
${ }^{7}$ Appendix B.
conscientiously accepted by most of the students as indicated by the grade point averages shown in Table 9. Those students in the upper third of the class had a grade point average of 3.9 while those in the lower third had an average of 3.0 .

The special problems and the criteria by which they were judged are also included in the Appendix. ${ }^{8}$ The upper third scored higher, an average of 1 grade point, than the lower third. However, the mean scores for both the upper and lower groups were not as high (3.3 and 2.3) on these special problems as the mean scores on the demonstrations.

## Summary

Scores on the four instruments administered at the beginning of the study were analyzed to determine whether any differences existed between the control and experimental sections. On the basis of the evidence, the null hypothesis, that no difference existed, was accepted. Additional personal and family information also indicated that both sections were very similar.

Difference scores between Form $Y$ and Form $X$ of the Cooperative Test in Foods and Nutrition showed greater gains for students in the experimental section than for those in the control section but these results were not significant.

[^16]
# Table 9. Comparison of Grade Point Averages for Demonstrations and Special Problems of Experimental Section 

|  | Demonstration | Special Problem |
| :--- | :---: | :---: |
| Upper third | 3.9 | 3.3 |
| Middle third | 2.5 | 3.1 |
| Lower third | 3.0 | 2.3 |

The Johnson Home Economics Interest Inventory difference scores from the pre-test to the post-test were not significant.

The lower group in the experimental section was more successful than the lower group in the control section as determined by gains in achievement on the Cooperative Test in Foods and Nutrition. On the other hand, the students in the upper group of the experimental section were more challenged than were the upper group of the control section as indicated by difference scores on the Johnson Home Economics Interest Inventory.

Significant correlations between the "after score" of the Cooperative Test in Foods and Nutrition and each of the other three instruments used indicated their value for predicting achievement in a college foods and nutrition course. However, it was evident that the Johnson Home Economics Interest Inventory was not the appropriate device for the purpose of this study.

Approximately one grade point difference existed. between mean scores for the upper and lower groups of the experimental section on the demonstrations given and the special problems undertaken.

## CHAPTER V

SUMMARY AND CONCLUSIONS

A wide range of differences exists among college freshmen, especially in state institutions of higher learning where no selective admission policies are used. The major purpose of this study was to investigate the effectiveness of adjusting learning experiences to the individual differences of students in a beginning foods and nutrition course. A second objective was to determine which factor, or combination of factors, would be most useful in evaluating a student's qualifications for purposes of placement in class sections, grouping within a class section or granting exemption from the course.

The general hypothesis examined in the study was: More effective learning takes place when college courses in foods and nutrition are adjusted to the background experience and special interests and abilities of students than when the same experiences are provided for all students alike.

The specific hypotheses examined were:

1. Students will learn more effectively if learning experiences are planned and selected in terms of
individual differences.
2. More satisfactory learning will result when individuals with similar abilities and experiences are grouped together.
3. Students with more ability and previous experience will be more highly motivated if challenging activities are provided for them.
4. Other factors than previous high school homemaking courses are parts of a composite which might predict success in a foods and nutrition course.

Certain assumptions were basic to the study:

1. In a school with a small enrollment, the small number of students and limited personnel and facilities do not permit assignment of students to homogeneous class sections.
2. Students in a beginning college course often represent a wide range of ability and experience.
3. There are testing devices which may be used to indicate individual differences among students.
4. Foods and nutrition courses at the college level are part of the total curriculum and the program is predetermined by state and local school requirements and by the position of these courses in a sequence with other subjects.

The data for the study were obtained from scores on four evaluation instruments administered prior to the course, The Gooperative Test in Foods and Nutrition, The

Henmon-Nelson Tests of Mental Ability, The Johnson Home Economics Interest Inventory, and a survey of "Student Experiences in Foods and Nutrition."

The Johnson Interest Inventory was used a second time following the course, along with an alternate form of the Cooperative Test to determine gains in achievement and interest as the result of the experimental procedure.

The sample was drawn from freshman students in the beginning foods and nutrition classes at the University of Southwestern Louisiana. Students participating in the experimental and control sections were randomly selected, and those in the experimental section were subdivided into smaller groups according to similarity of qualifications as ascertained by the four instruments used. Course content as presented in the lecture-discussion classes for both sections was similar or as nearly the same as possible. Laboratory activities for the experimental section were varied according to the different levels of ability of the groups. In the control section, students were randomly assigned to their groups and similar laboratory experiences were provided for all groups alike. Members of the experimental section were responsible for class demonstrations, but the same demonstrations were presented by the teacher in the control section. Special topics of interest to the individual students involving limited research techniques were pursued for further study by participants in the experimental section. No comparable activity was included
for the control section.

Results

While there was some evidence in a positive direction that the experimental procedure was effective in increasing learning of the less qualified and challenging those with a greater background of experience, the differences between the sections, computed by means of the student's "t" test, were not significant. Therefore, it was necessary to reject the major hypothesis and the first three specific hypotheses as listed.

Coefficients of correlation were significant at the one per cent level between the "after scores" of the Cooperative Test and the "before scores" of the Cooperative Test and between the "after scores" of the Cooperative Test and the experience survey. The correlation between the "after scores" of the Cooperative Test and each of the other two instruments was significant at the five per cent level. However, it was evident that the foods and nutrition sections of the Johnson Interest Inventory were not satisfactory for the purpose intended in this particular study.

The interrelationship of the four factors studied, as determined by partial correlation would indicate that the Cooperative Test, the experience survey, and the Henmon-Nelson Tests used together would be more predictive of individual success in a foods and nutrition course than
either test used separately or any combination of two of them.

## Conclusions

Certain conclusions regarding the materials and methods used and their value in the improvement of teaching college foods and nutrition courses were reached as the result of this study.

The sample included all freshman students enrolled in the beginning foods and nutrition classes during 19601961 who could be randomly assigned to the two sections. The two sections were as nearly equated as possible and statistical evidence showed no difference between the sections. However, the sample was small and the procedure might have shown more definite results if used with larger numbers or repeated with a second or third sample. Findings might have been different if both groups could have been taught during the same semester to rule out the factor that one group was undergoing an adjustment to college activities during the experiment, while the other group had made this adjustment before the experiment.

Homogeneous or heterogeneous grouping within a single class section has advantages and disadvantages. The distinction shown in the study between the two methods was not great enough to favor homogeneous grouping exclusively in situations similar to the experimental one.

The instruments used for obtaining information about
the students showed significant positive correlation with the criterion by which success in the course was judged. No single instrument alone would be adequate to predict an individual's probable accomplishment, but a combination of experience, intelligence, and achievement should all be considered.

The findings were sufficient to confirm the value of the instruments for dividing large groups into sections, or grouping within a class section. There was not enough evidence, however, to conclude that any one student might have been exempt from the course.

A different instrument for measuring interest in foods and nutrition would be desirable inasmuch as the Johnson Home Economics Interest Inventory did not measure interests in foods and nutrition specifically.

## Recommendations for Further Study

There is a definite need for further study in developing valid and reliable tests in foods and nutrition that could be used for pre- and post-testing purposes, for grouping, sectioning and advanced placement. These tests should include items involving application of facts and principles, rather than factual information alone.

A research study on what is actually being done in advanced placement of students, the criteria used for such placement, and an evaluation of the practices used would be valuable to schools faced with the placement problem.

Consideration should be given to high school grades in all subjects and in home economics specifically as additional variables from which achievement in foods and nutrition may be predicted.

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## Appendix A

Instruments Used for Collecting Data

# COOPERATIVE TEST IN FOODS AND NUTRITION FORM X <br> Sponsored jointly by the <br> Cooperative Test Division and the Evaluation Committee of the American Home Economics Association 

Prepared by the<br>SUBCOMMITTEE ON FOODS AND NUTRITION<br>CLARA BROWN ARNY (ex-officio), ERCEL EPPRICHT, ELIZABETH HEPWORTH FENIAK, HENRIETTA FLECK, DOROTHY SCHNELL, ESTHER F. SECNER (chairman), and WILLA VAUGHN TINSLEY

To the examiner: This test is designed to be taken with a separate answer sheet on which the student records his responses. All answers are to be marked on this sheet, not written in the booklet. Each student should be provided with an answer sheet. Scoring directions are given on the Rights Key.

General Directions: Do not turn this page until the examiner tells you to do so. This examination consists of two parts and requires 80 minutes of working time. The directions for each part are printed at the beginning of the part. Read them carefully and proceed at once to answer the questions. DO NOT SPEND TOO MUCH TIME ON ANY ONE ITEM; ANSWER THE EASIER QUESTIONS FIRST; then return to the harder ones, if you have time. There is a time limit for each part. You may not have time to answer all the questions in the time limit. If you finisb Part I before the time is up, go on to the next part. If you have not finished Part I when the time is up, stop work on that part and proceed at once to Part II. If you finish Part II before the time is up, you may go back and work on either part. No questions may be asked after the examination has begun. You may answer questions even when you are not perfectly sure that your answers are correct, but you should avoid wild guessing, since wrong answers will result in a subtraction from the number of your correct answers.

Time Limite

| Part | Minutes |
| :---: | :---: |
| I | 40 |
| II | 40 |
| Total | 80 |

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Copyright, 1950, by Educational Testing Service. All rights reserved. Printed in U.8.A. COOPERATIVE TEST DIVISION

Educational Teating Service
Chicago, III.
Los Angeles, Calif.

Directions: Each of the following incomplete statements or questions is followed by several possible answers. Select the answer that best completes the statement or answers the question. Then on your answer sheet blacken with your pencil the space between the dotted lines having the same number as your choice.

1. We are advised to use enriched flours. Enriching flour means
1-1 milling it carefully so as not to remove minerals and vitamins.
1-2 increasing the amount of protein.
1-3 adding moisture to keep the bread from drying out.
1-4 adding vitamins and minerals in various ways.
1-5 treating flour chemically to keep out weevils.
2. How many cups are there in a pound of butter? 2-1 One
2-2 Two
2-3 Three
2-4 Four
2-5 Five
3. It has been experimentally proved that proper dosages of cod-liver oil (in addition to an otherwise adequate diet) over a prescribed period will prevent rickets in infants. To which of the following is this effect due?
3-1 Vitamin A
3-2 Thiamine
3-3 Ascorbic acid
3-4 Vitamin E
3-5 Vitamin D
4. What is the specific nutritive element in lemon juice that makes it effective in preventing and curing scurvy?
4-1 Ascorbic acid
4-2 Riboflavin
4-3 Thiamine
4-4 Niacin
4-5 Vitamin D
5. At the end of the meal each member of the Smith family folded his napkin carefully and put it in his napkin ring. Charles, who was a guest, did not have a ring; he should
5-1 ask if there is an extra one he might use.
5-2 fold his napkin neatly and place it as it was when he sat down to the table.
5-3 crumple his napkin so that it will not be used by someone else by mistake.
5-4 lay his napkin in loose folds beside his plate.
6. Which of the following cooking methods would be most suitable to use for a good quality of sirloin steak ?
6-1 Fricasseeing
6-2 Broiling
6-3 Braising
6-4 Stewing
7. An important point to remember in buying citrus fruits for juice is that
7-1 juiciness is indicated by heaviness for size.
7-2 brown spots on the skin affect yield of juice.
7-3 small fruit is less juicy than large fruit.
7-4 a glossy skin indicates juiciness.
7-5 fruit should be picked before ripe for greatest juice yield.
8. When custards do not thicken, which of the following is the probable cause?
8-1 Too little sugar
8-2 Too much sugar
8-3 No vanilla
8-4 A small amount of salt
9. Important evidence of the relationship between weight and health is offered by the fact that 9-1 fat people often have good dispositions. 9-2 underweight people tire easily.
9-3 thin people are frequently unstable.
9-4 mortality figures are higher for overweight and underweight people than for those of normal weight.
10. Which of the following is a hard rennet cheese, with marbled interior due to penicillium mold:
10-1 Neufchâtel
10-2 Cottage
10-3 Swiss
10-4 Roquefort
10-5 Camembert
11. Which of the following is a hard cheese frequently grated and served on soup or macaroni!
11-1 Cottage
11-2 Parmesan
11-3 Neufchâtel
11-4 Roquefort
11-5 Camembert
12. Which of the following is a mild ripened cheese made from whole milk?
12-1 Cheddar
12-2 Cottage
12-3 Roquefort
12-4 Parmesan
13. Which of the following is the most important point to consider in making a choice among several unfamiliar brands of foods in order to get the best value for your money?
13-1 The shape and size of container
13-2 The market price per unit of weight
13-3 The brand name
13-4 The kind of label used
13-5 Your grocer's recommendation
14. When Jean dined with friends at the hotel, the term "table d'hôte" appeared on the menu. What did it mean ?
14-1 A regular dinner at a set price
14-2 Coffee served after the dinner
14-3 Coffee served with the dessert course
14-4 Savory tidbits of meat, cheese, or relishes
14-5 A stated price for each food
15. The incidence of nutritional goiter is highest 15-1 on the Atlantic seaboard.
15-2 in the Great Lakes region.
15-3 in the Southwest coast area.
15-4 in the Gulf coast area.
15-5 in the South Central states.
16. Approximately how many calories are produced when one gram of pure carbohydrate is burned in the body?
16-1 One
16-2 Two
16-3 Three
16-4 Four
16-5 Five
17. Approximately how many calories are produced when one gram of pure fat is burned in the body?
17-1 One
17-2 Two
17-3 Six
17-4 Four
17-5 Nine
18. Macaroni should be cooked in

18-1 a small amount of rapidly boiling water.
18-2 a large amount of rapidly boiling water.
18-3 a small amount of water kept at simmering temperature.
18-4 a large amount of water kept at simmering temperature.
18-5 a large amount of rapidly boiling water in a covered container.
19. When June boiled green cabbage, it was a very unappetizing grayed color. This was probably because she had
19-1 cooked it too long.
19-2 cooked it uncovered.
19-3 failed to cook it long enough.
19-4 cooked it in too much water.
20. Which of the following is a dessert made of whipped cream and fruit, and thickened with gelatin?
20-1 Pineapple Bavarian Cream
20-2 Raspberry sherbet
20-3 Orange blancmange
20-4 Lemon chiffon pudding
20-5 Prune whip
21. Which of the following may be a cream soup?

21-1 Bouillon
21-2 Broth
21-3 Consommé
21-4 Chowder
22. How many pounds are there in a kilogram?

22-1 One and one-half
22-2 Two
22-3 Two and two-tenths
22-4 Two and four-tenths
22-5 Three
23. When the meat supply is limited, certain groups of people should be given first consideration in the use of what is available. Which of the following would be most in need of the meat?
23-1 Men at office work
23-2 Men at active outside work
23-3 Children of school age
23-4 The aged
23-5 Women at moderately active work
24. To make a mixed vegetable salad one should

24-1 toss all ingredients lightly with two forks just before serving time.
24-2 toss all ingredients together an hour or two before serving time and place in the refrigerator.
24-3 mix thoroughly with a wooden spoon just before serving time.
24-4 mix thoroughly with a wooden fork an hour or two before serving time and place in the refrigerator.
25. When salad dressings made with mineral oil are used, it is possible that the body may absorb less
25-1 carotene.
25-2 thiamine.
25-3 ascorbic acid.
25-4 niacin.
25-5 riboflavin.
26. Not all of the nutritive elements contained in foods are available to the body. Which of the following furnishes the body with the most calcium?
26-1 Rhubarb
26-2 Spinach
26-3 Beet greens
26-4 Lettuce
26-5 Turnip greens
27. Which combination of conditions would be best for storage of winter onions?
27-1 Dry, dark, in original package
27-2 Dry, dark, tightly covered
27-3 Cool, somewhat moist, dark
27-4 Room temperature, dry, well ventilated

Items 28-31: Jane lives with her mother and father in a small house with very inadequate storage space. The family income is low. Jane has promised to do the marketing. The grocery list contained the following foods:

Cereal
Flour
Meat for stew
C'an of peas
28. Jane would get the most for her money in buying cereal if she bought

28-1 puffed wheat.
28-2 corn flakes.
28-3 oatmeal.
28-4 shredded wheat.
28-5 rream of wheat.
29. Which cut of beef would be best for stew?

29-1 Prime rib
29-2 Loin
29-3 Brisket
29-4 Round
29-5 (huck rib
30. Jane found the following information on a can of pras. Which item is essential to meet the specifications of the Federal Food. Drug. and Cosmetio Met?

30-1 The brand name
30-2 'The weight of the contents
30-3 The place where the peas were grown
$30-4 \quad \Lambda$ recipe telling how to use contents of (a)
31. Which would be the best flour for her to purchase? (The family buys bread.)

31-1 Box of ready-mix biscuit flour
31-2 Five-pound bag of flour
$31-3$ 24 $1 / 2$-pound bag of flour
31-4 Several small boxes of various kinds of prepared flour mixes

Items 32-34: Jane plans to make cocoa for a group of friends she has invited to a party. She will need to make $;$ times the amount of the following recipe.

$$
\begin{aligned}
& 1 / 4 \text { cup water } \\
& 4 \text { teaspoons of powdered cocoa } \\
& 4 \text { cups milk } \\
& 4 \text { teaspoons sugar } \\
& \text { a few grains of salt }
\end{aligned}
$$

32. How much cocoa will she need?

32-1 1 tablespoon
32-2 2 tablespoons
32-3 3 tablespoons
32-4 4 tablespoons
32-5 5 tablespoons
33. How murh sugar will she need?
:33-1 1 tablespoon
33-2 2 tablespoons
33-3 3 tablespons
$33-41 / 4$ cup
$33-5 \quad 1 / 3$ cup
34. How woll h milk will she need?

| $3+-1$ | 1 |
| :--- | :--- |
| quart |  |
| $3+-2$ | 2 |
| quarts |  |
| $3+-3$ | 3 |
| quarts |  |
| $34-4$ | 4 |
| quarts |  |
| $34-5$ | quarts |

Items 35-38: Which piece of silver is usually considered appropriate for eating each food listed below?

## Silver

1. Fork
2. Bouillon spoon
3. Soup spoon
4. Teaspoon
5. None
6. Creamed green beans
7. Corn chowder
8. Sliced oranges
9. Fresh Bing cherries

Items 39-42 are based on the group of breakfasts shown below.
.Applesauce ( $3 / 8 \mathrm{c}$.)
Sugar (2t.)
Oatmeal ( $1 / 2$ c.)
Light cream ( $1 / 4 \mathrm{c}$.)
Whole W. toast ( 1 sl .)
Butter (1 pat)
Coffee
39. Which breakfast would be the most suitable for an elementary-school child?

39-1 A
39-2 B
39-3 C
39-4 D
39-5 E
40. Which breakfast contains the fewest calories?

40-1 A
40-2 B
40-3 C
40-4 D
40-5 E

## Breakfast C

Whole W. toast (2 sl.)
Butter (1 pat)
Jelly (1 T.)
Milk ( $1 / 2 \mathrm{pt}$.)

## Breakfast D

Sliced orange ( 1 med.) Poached egg (1)
Whole W. toast (2 sl.) Butter (2 pats) Milk ( $1 / 2 \mathrm{pt}$.)

## Breakfast E

Tomato juice ( $1 / 2$ c.)
Bacon (2 sl.)
Whole W. toast (2 sl.)
Butter (2 pats)
Sugar (1t.)
Coffee
Cream (1 t.)
42. Which breakfast furnishes the most protcin:

42-1 A
42-2 B
42-3 C
42-4 D
42-5 E
43. If the temperature during cooking is increased what will tend to be the result on tenderness of eggs?

43-1 There will be an increase.
43-2 There will be a decrease.
43-3 There will be little or no change.
44. If the time spent in planning for jobs is decreased, what will tend to be the result on the time required in performance?
44-1 There will be an increase.
44-2 There will be a decrease.
44-3 There will be little or no change.
45. If the sugar in the flour mixture is decreased, what will be the result on the tendency to become brown on baking?
45-1 There will be an increase.
45-2 There will be a decrease.
45-3 There will be little or no change.
46. If the soda in a recipe is increased, what will be the result on redness of color of chocolate cake?

46-1 There will be an increase.
46-2 There will be a decrease.
46-3 There will be little or no change.
47. If the metabolic rate is increased, what will be the result on body weight 9
47-1 There will be an increase.
47-2 There will be a decrease.
47-3 There will be little or no change.
48. If the alkalinity of water is increased, what will be the result on tendency of flavones to turn yellow or gray ${ }^{9}$
48-1 There will be an increase.
48-2 There will be a decrease.
48-3 There will be little or no change.
49. If the density of mixture is increased, what will be the result on temperature at which mixture freezes?
49-1 There will be an increase.
49-2 There will be a decrease.
49-3 There will be little or no change.
50. If the time exposed to light is increased, what will be the result on riboflavin content of milk;
50-1 There will be an increase.
50-2 There will be a decrease.
50-3 There will be little or no change.
51. If the temperature in cooking a roast is decreased, what tends to be the result on waste through evaporation and drippings?
51-1 There will be an increase.
51-2 There will be a decrease.
51-3 There will be little or no change.
52. If the vitamin $D$ is increased from suboptimum level, what will tend to be the result on calcification?
52-1 There will be an increase.
52-2 There will be a decrease.
52-3 There will be little or no change.
53. If the altitude of locality is increased, what will be the result on temperature at which water boils?
53-1 There will be an increase.
53-2 There will be a decrease.
53-3 There will be little or no change.
54. If the cooking time is increased, what will be the result on color of carrots?
54-1 There will be an increase.
54-2 There will be a decrease.
$54-3$ There will be little or no change.
55. If the degree of hydrogenation is decreased, what will be the result on fat content of vege. table shortening!
55-1 There will be an increase.
55-2 There will be a decrease.
55-3 There will be little or no change.

Items 56-60: Listed below are five methods of home preservation of food. Which one is best described by each of the following statements !

## Methods of Processing

1. Cold pack and water bath
2. Hot pack and water bath
3. Open kettle
4. Oven
5. Pressure cooker
6. Must be used in making strawberry jam
7. Should always be used in canning pork
8. Most commonly used when fruit is canned in tin
9. When used with peaches produces a product with the liquid most free from sediment but which may not have good keeping qualities
10. Is unsafe to use because sufficiently high temperature may not be maintained or jars may explode

Items 61-67: Below are listed characteristics of unethical or unauthoritative statements regarding health and nutrition.

1. Contains exaggerated promise of sure cure or recovery
2. Authority cited is described only in general terms
3. Deliberately attempts to deceive by use of scientific terms which are unintelligible to the public

Which of the above is illustrated in each of the following?
61. "'Diet for Glamour and Sex Appeal' . . . by one of the nation's leading nutritionists."
62. "A few teaspoons of . . . can snatch pellagra victims from the jaws of death."
63. ". . . satisfies the metabolic needs of the moment; replenishes waning glycogen stores."
64. "Studies show that an overweight person in average health can reduce up to a pound a day with perfect safety, by using . . ."
65. "Surveys the world over show that constipation is the commonest ill of modern humanity; . . . will cure it for you."
66. "You can be absolutely sure that if you follow this wonder diet faithfully, you are going to get slim."
67. "Many eminent specialists have recently agreed that..."

Items 68-69: Mary's baking powder biscuits tasted quite good but were brown-speckled, and the tops went up at a slant instead of being flat.
68. The spots might be prevented by

68-1 using less fat.
68-2 using more baking powder.
68-3 omitting sugar.
68-4 sifting dry ingredients more than once.
68-5 baking at a hotter oven temperature.
69. The uneven shape of the baking powder biscuits was the result of
69-1 not enough sifting of dry ingredients.
69-2 too hot an oven.
69-3 too cool an oven.
69-4 poor technique in cutting and transferring to pan.
69-5 removing from the oven before thoroughly cooked.

Go on to the next part.
(4) minutes)

Directions: Each of the following incomplete statements or questions is followed by several possible answers. Select the answer that best completes the statement or answers the question. Then on your answer shert blacken with your pen-il the spare between the dotted lines having the same number as your choice.
70. To ohtain the greatest amomit of vitamin $\mathcal{C}^{-}$ from cabbare. you should
70-1 boil it for no more than 10 minutes.
70-2 make it into kraut.
70-3 fry it.
70-4 serve it raw.
71. Which rombination of characteristics would probably be best if you wanted to prepare a very attractive salad of orange sections?
71-1 Simall size, smooth skin, with seeds
71-2 Medium size, smooth skin, with seeds
71-3 Large size, rough skin, seedless
71-4 Large size, rough skin, with seeds
72. Vitamins are recognized as necessary in our daily diet. You should take vitamin concentrates when
72-1 you get up feeling tired.
72-2 your gums are sore.
72-3 you are nervous.
i2-4 you have a poor appetite.
72-5 you are ordered by your physi-ian to take them.
73. Mary is acting as a waitress at a luncheon her mother is giving. When she serves the coffee, she should place it
73-1 at the right of the spoon.
73-2 at the tip of the knife.
73-3 at the left of the fork.
73-4 above the main plate.
74. Anne used a tested muffin recipe and baked the muffins at 450 degrees $F$. for 12 minutes. The muffins were peaked, tunnelled and very brown. The tunnels were probably caused by
74-1 inaccurate measurement of baking powder.
74-2 insufficient mixing of ingredients.
74-3 over-mixing of ingredients.
74-4 too hot an oven temperature.
$74-5$ too low an oven temperature.
75. Which combination of conditions would be best for storage of a meat roast purchased on Saturday to be used for Sunday dinner?
75-1 Coldest part of refrigerator outside of freezing compartment in original package
75-2 Inside freezing compartment in original package
75-3 Coldest part of refrigerator outside of freezing compartment, loosely covered with waxed paper
75-4 Inside freezing compartment, wrapped in waxed paper
76. $\Lambda$ pproximately how many cups are there in a pound of granulated sugar?
76-1 One
76-2 Two
76-3 Three
76-4 Four
76-5 Five
77. Which of the following would be the most satisfactory nutritional substitute for fresh orange juice?
77-1 Apple juice
77-2 Carrot juice
77-3 Prune juice
77-4 Pineapple juice
77-5 ('anned grapefruit juice
78. When frozen peas are to be cooked by boiling, one should
78-1 thaw them before cooking.
78-2 cook them in very little water.
78-3 put them on to cook in water to cover.
78-4 put them on to cook 30 minutes before the neal is to be served.
79. What is the chief contribution made to the diet by cereals and grain products?
79-1 Fiber
79-2 Low cost energy
79-3 Resistance to infection
79-4 Building and repairing
79-5 Wholesome flavor
80. The richest source of iron among animal foods as a group is
80-1 milk.
80-2 eggs.
80-3 muscle meat.
80-4 internal organs.
80-5 fish.
81. Which food will be particularly helpful to a person suffering from mutritional goiter?
81-1 Liver
81-2 Salmon
81-3 Trout
81-4 Lean pork
81-5 Lean beef
82. When cooked the specified length of time, a lemon pie filling (thickened with corn starch) did not seem to be thick enough; cooking was therefore continued. Instead of thickening, however, it grew thinner. This was the result of
82-1 hydrolysis.
82-2 osmosis.
82-3 electrolysis.
82-4 dehydration.
82-5 hydrogenation.
83. To prepare a rib roast of beef to get a palatable product with minimum loss one should
83-1 sear it in a very hot oven until brown on all sides; then lower temperature to finish cooking.
83-2 roast it in a hot oven for the entire cooking period.
83-3 roast it in a slow oven for the entire cooking period.
83-4 sear it on top of stove and then roast it in a moderate oven.

Go on to the next page.
84. How many cups are there in a No. 2 can ?

84-1 One and one-half
84-2 Two
84-3 Two and one-half
84-4 Three
84-5 Three and one-half
85. Spoilage due to-enzume action during storage of frozen vegetables is probably caused by failure to
85-1 blanch.
85-2 boil.
85-3 freeze immediately after picking.
$85-1$ sort product carefully.
85-5 wash thoroughly.
86. Anne used the following proportions for her first pie crust : $1 / 3$ cup fat, 1 cup flour, $1 / 2$ tsp. salt, water to moisten. The pastry was hard and tough. What was probably the reason for this?
86-1 Too little fat
86-2 Too much fat
86-3 Too little water
86-4 Too much water
86-5 Too little flour

Caution: Note that in items 87-96, the wording of the question is negative. Do not overlook the word not in the question.
87. Which one of the following is not among the requirements of the 1938 Food, J)rug, and Cosmetic Act?
87-1 That the contents of the parkage be correctly labeled
si-2 That the weight of the rontents be correctly stated
87-3 That the product be worth the price charged
87-4 That none of the ingredients be injurious 87-5 That no adulterunts be present
88. A normal person may be able to prevent night blindness by eating rertain foorls. Which of these would be of no value for this purpose?
88-1 Liver
88-2 Butter
88-3 Eggs
88-4 Cream of Wheat
88-5 Spinach
89. Which of the following foods is high in nutritive value but does not supply vitamin $C$ in significant amounts?
89-1 Raw cabbage
89-2 Grapefruit
89-3 Orange
89-4 Tomato
89-5 Banana
90. Adequate nutrition in pregnancy influences the mother's health as well as the development of the baby. Which dietary need is not increased during the first four months of pregnancy
90-1 Iron
90-2 Vitamins
90-3 Calories
90-4 Protein
90-5 Calcium
91. Which of the following is not characteristic of a good cut of beef?
91-1 Purple stamp on the skin
91-2 Smooth, velvety appearance
91-3 Well marbled with ereamy, flaky fat
91-4 Light pink color in the lean
92. Which of the practices below is not approved by the American Medical Association?
92-1 Enriching refined grain products
92-2 Irradiating milk
92-3 Adding vitamins to candy
92-4 Fortifying margarine
93. The chocolate fudge that Helen made for $V$ 'alentine boxes was creamy and smooth. Which of the following procedures did she avoid in making the fudge?
93-1 Used thermometer to check boiling temperature
93-2 $\Lambda$ dded butter when removing from flame
93-3 Allowed it to cool undisturbed before beating
93-4 Slowly stirred it while it was cooling
93-5 Beat vigorously until mixture stiffenerl and lost its high gloss
94. A large amount of waste will increase the cost per serving of vegetables. In which of the following fresh vegetables (as they come from the garden) would there be least waste?
94-1 C'auliflower
94-2 Corn
94-3 (ircen peas
94-4 Lima beans
94-5 String beans
95. Certain nutrients may be stored in the body when eaten in excess of the daily need. Which one listed below is not stored, and must therefore be provided for optimum nutrition?
95-1 Calcium
95-2 Vitamin A
95-3 $\Lambda$ seorbic acid
95-4 Iron
96. To secure maximum volume in angel food cake. which of the following should not be done?
96-1 Beat with a Dover beater
96-2 Sift Hour several times
96-3 Have eggs thoroughly chilled
96-4 Bake in an oven at about $400^{\circ}$
96-5 Add cream of tartar to erger whites

Items 97-102: Which type of leavening is used in each of the products listed below :

## Types of Leavening

1. Air
2. Steam
3. Carbon dioxide produced by baking powder
4. Carbon dioxide produced by yeast
5. Meringue on a pie
6. Cream puffs
7. Shortcake
8. Cloverleaf rolls
9. Butter cake
10. Sponge cake

Items 103-108: Assuming that a limited amount is to be spent on food, select the kind of food that will give the best return for the money in furnishing the nutritive element designated.

## 103. Calcium

103-1 Milk
103-2 Eggs
103-3 Fruits
103-4 Vegetables
103-5 Meat
104. Thiamine

104-1 Dried navy beans
104-2 Ready-prepared cereal
104-3 Macaroni
104-4 Corn meal
104-5 Potatoes
105. Food energy and vitamin A value

105-1 Beef fat
105-2 Butter
105-3 Lard
105-4 Sugar
105-5 Honey
106. Oarbohydrates

106-1 Eggs
106-2 Butter
106-3 Grain products
106-4 Nuts
106-5 Vegetables

## 107. Protein and fat

107-1 English walnuts
107-2 American cheese
107-3 Butter
107-4 Lard
107-5 Cream
108. Food energy and protein

108-1 Bacon
108-2 Bread
108-3 Ice cream
108-4 Apples
108-5 Carrots

Items 109-118: Mrs. J. is entertaining four guests at dinner at $6: 00 \mathrm{p} . \mathrm{m}$. She will do all the preparation and service herself. The menu is given below. She plans to begin actual preparation at $4: 30$.

| Menu |  |
| :---: | :---: |
| Broiled Liver Mashed Potatoes |  |
| Buttered Frozen Green Peas |  |
| Tomato and Lettuce Salad |  |
| Refrigerator Rolls | Butter |
| Applesauce | Gingersnaps |

Select, from the list below, the time period that would be the best time to do each of the tasks listed at the right, and indicate the number of your choice.

## Time Periods

1. In morning (3 tasks)
2. In afternoon before 5 o'clock (2 tasks)
3. Between $5: 00$ and $5: 30$ (2 tasks)
4. Between period (3) and period (5)
(2 tasks)
5. Last 10 minutes before meal is served (1 task)
6. Wash lettuce and tomato and chill.
7. Arrange salad on plates.
8. Mix dough for quick-method rolls.
9. Put rolls in oven.
10. Set table.
11. Peel potatoes and start water heating.
12. Prepare and chill applesauce.
13. Start peas to cook.
14. Begin to broil meat.
15. Make gingersnaps.

Items 119-123: Dorothy was to run the house for her father and her 6 -year-old sister while her mother was away for three weeks, and she was especially concerned about the meals. Mark answer space 1, for each of the suggestions which might help her, and mark answer space 2 for those which would not.
119. Plan meals for several days at a time.
120. Plan to serve only foods which they all liked especially well.
121. Do not buy any foods which could not be prepared in a short time each day.
122. Market only once or twice a week.
123. Inspect the refrigerator when she came home each day to see what she needed to buy for the evening meal.

Items 124-127: Jane is a college freshman. She is inviting 3 girls and 4 men to her home for supper following a Saturday skating party. She has planned the following menu:

Swiss Steak
Baked Potatoes String Beans
Lettuce Wedges with Thousand Island Dressing

$$
\begin{aligned}
& \text { Apple Pie } \\
& \text { Milk }
\end{aligned}
$$

When Jane does the marketing, she wishes to purchase sensible amounts, even if some supplies may be left over, since they could be used later for family meals.
124. How much milk should be ordered, allowing 2 servings for each man and one for each girl? 124-1 One quart
124-2 One quart and one pint
124-3 Two quarts
124 - Three quarts
125. How many pounds of steak should she buy? 125-1 One
125-2 One and one-half
125-3 Two
125-4 Two and one-half
125-5 Three
126. The grocer tells Jane that he has only No. 2 and No. 10 cans in the grade of beans she wants to buy. Which should she order?
126-1 One No. 2 can
126-2 Two No. 2 cans
126-3 Three No. 2 cans
126-4 One No. 10 can
126-5 Two No. 10 cans
127. What quantity and variety of apples would be her best choice for the apple pie?
127-1 2 pounds of Delicious
127-2 3 pounds of Delicious
127-3 5 pounds of Delicious
127-4 2 pounds of Winesaps
127-5 3 pounds of Winesaps

Items 128-133:
Menu for a Buffet Luncheon
Tuna Fish and Noodle Hot Dish Molded Salad Buttered Rolls Chocolate Cake Coffee


The arrow indicates the direction in which the guests are to move around the table.

Indicate in which of the areas on the table shown in the diagram above you would place each of the following:
128. Decorative piece

| $128-1$ | A |
| :--- | :--- |
| $128-2$ | B |
| $128-3$ | D |
| $128-4$ | E |
| $128-5$ | F |

129. Hot dish

129-1 A
129-2 B
129-3 C
129-4 D
129-5 F
130. Napkins and silver

130-1 A
130-2 C
130-3 D
130-4 E
130-5 F
131. Plates

131-1 A
131-2 B
131-3 C
131-4 D
131-5 F
132. Rolls

132-1 B
132-2 C
132-3 D
132-4 E
132-5 F
133. Salad

133-1 A
133-2 B
133-3 C
133-4 D
133-5 F

Items 134-138: A college girl ate the following foods for breakfast and lunch.

## Breakfast

Cantaloupe ( $1 / 2$ melon)<br>Wheat Flakes (1 c.)<br>Whole Milk ( $1 / 2$ c.)<br>Coffee and Cream<br>\section*{Lunch}<br>Bacon and Tomato Sandwich (one)<br>(on whole wheat toast)<br>Vanilla Milk Shake<br>Plain Chocolate Bar

When she selects her evening meal, which food listed (an average serving) will most nearly complete her recommended daily allowance for the nutritive element indicated?

## 134. Thiamine

134-1 Milk
134-2 Lean beef
134-3 Lean pork
134-4 Enriched bread
134-5 No other source needed
135. Riboflavin

135-1 Milk
135-2 Enriched bread
135-3 Orange
135-4 Raw cabbage
135-5 No other source needed

## 136. Niacin

136-1 Enriched bread
136-2 Peanut butter
136-3 Milk If you finish befory the time is
136-4 Ground beef
136-5 No other source needed

## 137. Ascorbic acid

137-1 Bak potato
137-2 Creamed carrots
137-3 Milk
137-4 Eggs
137-5 No other source needed
138. Protein

138-1 Enriched bread
138-2 Macaroni and cheese
138-3 Dried beans
138-4 Fried potatoes
138-5 No other source needed

Prepared by the<br>SUBCOMMITTEE ON FOODS AND NUTRITION<br>CLARA BROWN ARNY (ex-officio), ERCEL EPPRIGHT, ELIZABETH HEPWORTH FENIAK, HENRIETTA FLECK, DOROTHY SCHNELL, ESTHER F. SEGNER, (Chairman), and WILLA VAUGHN TINSLEY

To the examiner: This test is designed to be taken with a separate answer sheet on which the student records his responses. All answers are to be marked on this sheet, not written in the booklet. Each student should be provided with an answer sheet. Scoring directions are given on the Rights Key.

General Directions: Do not turn this page until the examiner tells you to do so. This examination consists of two parts, and requires 80 minutes of working time. The directions for each part are printed at the beginming of. the part. Read them carefully, and proceed at once to answer the questions. DO NOT SPEND TOO MUCH TIME ON ANY ONE ITEM. ANSWER THE EASIER QUESTIONS FIRST; then return to the harder ones if you have time. There is a time limit for each part. You may not have time to answer all the questions in the time limit. If you finish Part I before the time is up, go on to the next part. If you have not finished Part I when the time is up, stop work on that part and proceed at once to Part II. If you finish Part II before the time is up, you may go back and work on either part. No questions may be asked after the examination has begun. You may answer questions even when you are not perfectly sure that your answers are correct, but you should avoid wild guessing, since wrong answers will result in a subtraction from the number of your correct answers.

Time Limits

| Part | Minutes |
| :---: | :---: |
| I | 40 |
| II | 40 |
| Total | 80 |

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Directions: For each of the following incomplete statements or questions several possible choices are provided. Select the choice that best completes the statement or answers the question. Then on your answer sheet blacken with your pencil the space between the dotted lines having the same number as that of your choice. In some cases, when several items refer to one set of choices, the same choice may be the correct answer to more than one item.

1. Helen Smith, a college freshman, is overweight and is interested in reducing her weight. She should
1-1 go on a liquid diet.
1-2 go on a citrus fruit diet.
1-3 plan a diet which is adequate in all dietary essentials but low in calories.
1-4 follow the diet recommended by an artist's model.
1-5 avoid potatoes and milk in her diet.
2. People in the goiter belt should eat salmon and other salt water fish because they provide
2-1 chlorine.
2-2 iodine.
2-3 sodium.
2-4 vitamins.
3. It is difficult to obtain adequate calcium in the usual American diet unless the diet includes
3-1 milk.
3-2 bread.
3-3 potatoes.
3-4 meat.
3-5 butter.
4. Which of the following is a soft cheese made from skim milk curd?
4-1 Edam
4-2 Cottage
4-3 Swiss
4-4 Neufchatel
4-5 Camembert
5. In preparing bread for eating, one should

5-1 butter a slice and eat it.
5-2 butter a slice and break it into smaller pieces before eating it.
5-3 break a slice in half and butter each half separately.
5-4 break a slice into small portions and butter only one portion at a time.
6. Surveys have shown that the American diet tends to be deficient in green and yellow vegetables. This suggests that the diet is deficient in
6-1 cellulose and water.
6-2 sugars and starches.
6-3 minerals and vitamins.
6-4 complete proteins.
6-5 incomplete proteins.
7. Which of the following cuts of meat has the largest amount of bone in a serving?
7-1 Flank steak
7-2 Loin pork chop
7-3 Spare ribs
7-4 Round steak
7-5 Boston butt
8. Bob wants to increase his information about vitamin preparations. Which one of the following will be the most reliable source of information?
8-1 Hygeia
8-2 Drugstore advertisement in the newspuper
8-3 Good Housekeeping
8-4 Mail order catalogs
8-5 Physical Culture
9. One-fourth cup contains

9-1 one tablespoon.
9-2 two tablespoons.
9-3 three tablespoons.
9-4 four tablespoons.
9-5 one-half tablespoon.
10. In a macaroni and cheese dish, the cheese is mos: likely to be tough if it is
10-1 melted in the white sauce.
10-2 grated and mixed with the other ingredi ents when put in the casserole.
10-3 grated and arranged with other ingredients in layers, with buttered crumbs on top.
10-4 sliced thin and placed on top of the macaroni when it is put in the oven.
11. Ellen and a friend were discussing the accuracy of certain buying tips they had heard. Which one of the following tips is inaccurate?
11-1 Flavor is a determining factor in the price of cheese.
11-2 Ready-prepared cereals such as cor: flakes are more expensive on the basis ol nutritive value than cereals which require cooking.
11-3 The price of baking powder indicates its leavening power.
11-4 Delicatessen foods generally cost more than home-prepared foods.
11-5 The cost of a fancy container is included in the price of an article.

Go on to the next pase.
12. Sally and Susan are twins. They live at home, eat the same food in approximately the same amounts, play together most of the time, and are the same height; however, Sally is about ten pounds underweight and Susan is normal in weight. Which of the following is the probable cause of the difference in weight?
12-1 Avitaminosis
12-2 Metabolic rate
12-3 Nitrogen balance
12-4 Specific dynamic action
12-5 Utilization of minerals
.3. Which combination of conditions would be best for storing frozen vegetables purchased on Friday to be used for Sunday dinner?
13-1 Cool, in original package
13-2 On coldest shelf of refrigerator, in original package
13-3 Inside freezing compartment of refrigerator, wrapped in waxed paper
13-4 Inside freezing compartment in refrigerator, in original package
14. Which one of the following supplements to the diets of infants is highly important in the prevention and cure of rickets?
14-1 Orange juice
14-2 Strained vegetables
14-3 Scraped broiled liver
14-4 Strained cereal
14-5 Cod-liver oil
5. Which vegetable is served hot in a thickened sour sauce?
15-1 Sautéed potatoes
15-2 Potatoes au gratin
15-3 Glazed carrots
15-4 Harvard beets
15-5 Buttered beets
6. Which grapes make the best jelly?

16-1 Concords
16-2 Malagas
16-3 Seedless
16-4 Tokays
7. The most important reason for blanching vegetables before freezing is to prevent
17-1 loss of vitamin content.
17-2 loss of mineral content.
17-3 enzyme action during storage.
17-4 too rapid freezing.
18. Approximately how many cups are there in a pound of fat?

| 18-1 | One |
| :--- | :--- |
| 18-2 | Two |
| 18-3 | Three |
| 18-4 | Four |
| $18-5$ | Five |

19. Which of the following is responsible for the darkening of apples after peeling?
19-1 Acids
19-2 Enzymes
19-3 Minerals
19-4 Pigments
19-5 Sulfur
20. How many calories are produced when one gram of protein is burned in the body?
20-1 Nine
20-2 Two
20-3 Three
20-4 Four
20-5 Five
21. In order to get the most food value for the money, a family on an extremely low income should buy a very limited amount of
21-1 whole grain products.
21-2 dried milk.
21-3 lean meat.
21-4 cabbage.
21-5 fortified margarine.
22. Which one of the following is a disease that may be transmitted from cows to human beings through unpasteurized milk?
22-1 Eczema
22-2 Undulant fever
22-3 Chicken pox
22-4 Rheumatic fever
22-5 Poliomyelitis
23. Vitamins differ in their stability. Which one is most easily lost from foods through storage, preparation, and exposure to air?
23-1 Vitamin A
23-2 Thiamine
23-3 Ascorbic acid
23-4 Vitamin D
23-5 Niacin
24. Which of the following foods should be thoroughly cooked before it is frozen?
24-1 Apricots
24-2 Broccoli
24-3 Peas
24-4 Rhubarb
24-5 Squash
25. Which of the following is a hard rennet cheese originally produced in Holland?
25-1 Neufchâtel
25-2 Parmesan
25-3 Edam
25-4 Roquefort
25-5 Limburg

Items 26-28: Sarah wants to make a plain butter cake, using one-half the recipe given below.


She has the following measures:

1. a glass measuring cup with a lip (pictured above)
2. a metal measuring cup with a flat top, holding just one cup (pictured above)
3. two measuring spoons: a teaspoon (tsp.) and a tablespoon (tbsp.)
4. To get the correct amount of flour, she should fill the
26-1 glass cup and level off with knife.
26-2 metal cup and level off with knife.
26-3 metal cup and add 6 level tbsp. of flour.
26-4 metal cup and level off with knife; then add 4 level tbsp. of flour.
26-5 glass cup, level off with knife, and empty into bowl; then fill cup full.
5. To get an accurate portion of milk in the easiest way, she should measure $\frac{1}{2}$ cup of it by using the
27-1 teaspoon and tablespoon.
27-2 glass cup.
27-3 metal cup.
27-4 glass cup and tablespoon.
27-5 metal cup and tablespoon.
6. To get the correct amount of fat most quickly, if the fat has just been taken from the refrigerator, she should
28-1 fill the metal cup to the $\frac{3}{4}$ line with cold water, and add fat to fill to the brim.
28-2 fill the glass cup to the $\frac{3}{4}$ line with cold water, and add fat to fill to the brim.
28-3 fill the glass cup to the $\frac{3}{3}$ line with cold water, and add fat until water reaches the 1 -cup line, with fat held under water.
28-4 pack fat in the glass cup until it reachest the $\frac{1}{4}$ line.
28-5 fill the metal cup $\frac{1}{4}$ full of cold water, and add fat to fill to the brim.

Items 29-31 : Dorothy is planning the following menu for luncheon:
Cheese Souffé
Celery Sticks Plain Muffins
Fruit Cup
Milk
29. If the souffle is set in a pan of water, the proper oven temperature for the souffé is
29-1 $275^{\circ} \mathrm{F}$.
29-2 $350^{\circ} \mathrm{F}$.
29-3 $425^{\circ} \mathrm{F}$.
29-4 $450^{\circ} \mathrm{F}$.
29-5 $500^{\circ} \mathrm{F}$.
30. The proper oven temperature for the muffins is $30-1 \quad 325^{\circ} \mathrm{F}$.
30-2 $375^{\circ} \mathrm{F}$.
$30-3 \quad 425^{\circ} \mathrm{F}$.
$30-4 \quad 450^{\circ} \mathrm{F}$.
$30-5475^{\circ} \mathrm{F}$.
31. Dorothy realizes that she will have to change her menu because of a conflict in oven temperatures. Which of the following will be the wisest substitution for the cheese souffe?
31-1 Baked egg in bacon ring
31-2 Cheese fondue
31-3 Macaroni and cheese
31-4 Scrambled egg
32. If an individual's calorie intake is increased beyond his needs, what will be the result on body weight?
32-1 There will be an increase.
32-2 There will be a decrease.
32-3 There will be little or no change.
33. If the amount of green vegetables eaten is in. creased, what will be the result on body weight?
33-1 There will be an increase.
33-2 There will be a decrease.
33-3 There will be little or no change.
34. If the amount of cooking time is increased, what will be the probable result on the ascorbic content of cabbage?
34-1 There will be an increase.
34-2 There will be a decrease.
34-3 There will be little or no change.
35. If the temperature during cooking is increased. what will be the result on the tenderness of cheese?
35-1 There will be an increase.
35-2 There will be a decrease.
35-3 There will be little or no change.
Go on to the next page.
36. If the amount of fat in pastry is increased, what will be the result on tenderness?
36-1 There will be an increase.
36-2 There will be a decrease.
36-3 There will be little or no change.
37. If rancidity is increased, what will be the result on $A$ and $D$ vitamin value?
37-1 There will be an increase.
37-2 There will be a decrease.
37-3 There will be little or no change.
38. If the density of sirup is increased, what will be the result on the temperature at which the sirup boils?
38-1 There will be an increase.
38-2 There will be a decrease.
38-3 There will be little or no change.
39. If the acidity of the cooking medium is increased, what will be the result on the brightness of chlorophyll?
39-1 There will be an increase.
39-2 There will be a decrease.
39-3 There will be little or no change.
40. If the amount of sour milk is increased, what will be the result on the amount of soda needed in the recipe?
40-1 There will be an increase.
40-2 There will be a decrease.
40-3 There will be little or no change.
41. If the amount of protein and fat in the menu is increased, what will be the result on the satiety value of the meal?
41-1 There will be an increase.
41-2 There will be a decrease.
41-3 There will be little or no change.
42. If the acidity of the cooking medium is increased, what will be the result on the redness of anthocyanins?
42-1 There will be an increase.
42-2 There will be a decrease.
42-3 There will be little or no change.
43. If the thiamine content of a diet inadequate in this vitamin is increased, what will be the result on the utilization of carbohydrates?
43-1 There will be an increase.
43-2 There will be a decrease.
43-3 There will be little or no change.
44. If the pressure in a pressure cooker is increased, what will be the result on the temperature at which water boils?
44-1 There will be an increase.
44-2 There will be a decrease.
44-3 There will be little or no change.
45. If a low or medium family income is increased, what will be the result on the percentage of income spent for food?
45-1 There will be an increase.
45-2 There will be a decrease.
45-3 There will be little or no change.

Items 46-50: Below are listed characteristics of unethical or unauthoritative statements regarding health and nutrition.

1. Promotes unfounded fear of dire results of failure to obtain product advertised
2. Suggests that loss of attractiveness is due to lack of constituents of product advertised
3. Prescribes for all kinds of human ills without regard to individual needs
4. Contains exaggerated promise of sure cure or recovery.

Which of the above is illustrated in each of the following?
46. "If you suffer from headaches, lack of pep, dull eyes, sallow skin, or weakness, try . .""
47. "You owe it to your unborn child to fortify your system against the strains that are heaped upon it at this time. See your druggist at once for . . . vitamin tonic."
48. "Your morale will zoom like a pursuit plane as you watch surplus pounds vanish."
49. "Is your charm for men slipping? Others have taken . . . to make them look years younger."
50. "Mary did not realize that it was her fault when John started paying attention to other women, but her doctor told her to start using . . . for body odors."

Items 51-57: Different cuts of meat vary greatly in price. What would be the lowest income level at which one could afford to buy most frequently each cut listed below?

## Income Levels

1. Liberal or high cost
2. Moderate cost
3. Minimum or low cost
4. Sirloin steak
5. Short ribs of beef
6. Rib roast
7. Crown roast of lamb
8. Rump roast
9. Chuck roast
10. Pork liver

Items 58-64: Listed below are five methods of home preservation of food.

## Methods of Processing

1. Cold pack and water bath
2. Hot pack and water bath
3. Open kettle
4. Oven
5. Pressure cooker

Which method is best described by each of the following statements?
58. Is unsafe to use because jars may explode if sufficiently high temperature is maintained
59. Must be used in making orange marmalade
60. Should be used in canning chicken
61. Requires the sterilization of the container before it is filled
62. Should be used when vegetables are to be canned in tin
63. Is likely to over-process fruit
64. Is most frequently used in canning cherries, peaches, and plums

Items 65-70: Assuming that a limited amount is to be spent on food, select the kind of food that will give the best return for the money in furnishing the nutritive element designated.

## 65. Phosphorus and iron

65-1 Soy beans
65-2 Buttermilk
65-3 American cheese
65-4 White fish
65-5 Citrus fruits
66. Phosphorus and protein

66-1 Yellow vegetables
66-2 Tomatoes
66-3 Grapefruit
66-4 Dry legumes
66-5 Sweet potatoes
67. Calcium and phosphorus

## 67-1 Meat

67-2 Skim milk
67-3 Eggs
67-4 Root vegetables
67-5 Green and leafy vegetables
68. Food energy

68-1 Root vegetables
68-2 Leafy vegetables
68-3 Citrus fruits
68-4 Other fruits
68-5 Milk
69. Vitamin A value

69-1 Potatoes
69-2 Milk
69-3 Cereals
69-4 Meat
69-5 Beet greens
70. Riboflavin

70-1 Milk
70-2 Beef liver
70-3 Fruits
70-4 Vegetables
70-5 Grain products

Go on to the next part.

Directions: Continue as in the preceding part.
71. Rickets is usually evidenced by

71-1 bleeding gums.
71-2 loss of appetite.
71-3 melancholia.
71-4 poorly formed bones.
71-5 dry, scaly skin.
72. Which food must be well cooked because of the danger of trichinosis?
72-1 Chicken
72-2 Wild duck
72-3 Fish
72-4 Mutton
72-5 Fresh pork sausage
73. Eleanor planned to have fresh strawberries during their best season for Sunday dinner, but found the cost higher than that of canned peaches. What factor was probably most important in making fresh fruit more expensive than canned fruit?
73-1 Advertising cost
73-2 Cost of container
73-3 Inedible refuse of fresh fruit
73-4 Perishability
73-5 Processing cost
74. One tablespoon contains

74-1 one teaspoon.
74-2 two teaspoons.
74-3 three teaspoons.
74-4 four teaspoons.
74-5 five teaspoons.
75. Vitamin K is sometimes given before surgery or childbirth to assist in the normal
75-1 relaxation of muscular tension.
75-2 regulation of body temperature.
75-3 heart beat.
75-4 clotting of blood.
75-5 production of new cells.
76. In making a mixed green salad, one should

76-1 mix the salad dressing lightly with the chilled vegetables in a bowl.
76-2 mix the dressing with the salad early and place it in the refrigerator.
76-3 stir the salad thoroughly so that the ingredients are well mixed.
76-4 combine the salad ingredients when they are at room temperature and then chill.
77. How many tablespoons of flour should be used per cup of liquid in making a medium white sauce?
77-1 One
77-2 Two
77-3 Three
77-4 Four
78. Which one of the following factors affecting the total energy requirement of an adult is the most variable?
78-1 Sex
78-2 Size of individual
78-3 Shape of body
78-4 Muscular activity
78-5 Climate
79. Which combination of conditions would be best for storing canned fruit for winter use?
79-1 Cool, dry, dark
79-2 Room temperature, somewhat moist, dark
79-3 Room temperature, dry, dark
79-4 Cool, somewhat moist, dark
80. When Edith dined out with friends at the hotel, the term a la carte appeared on the menu. What did it mean?
80-1 A regular dinner at a set price
80-2 Coffee served after the dinner
80-3 Coffee served with the dessert course
80-4 Savory tidbits of meat, cheese, or relishes
80-5 A stated price for each food
81. Although margarines are made mostly of oils, they are made into solid form by the process of
81-1 crystallization.
81-2 emulsification.
81-3 irradiation.
81-4 hydrogenation.
81-5 saponification.
82. Although milk is known as the most nearly perfect food, it is, nevertheless, low in its content of 82-1 complete protein.
82-2 high quality fat.
82-3 phosphorus.
82-4 calcium.
82-5 iron.
83. Margaret's dentist recommended foods rich in ascorbic acid. Which one of the following foods would yield the highest amount of ascorbic acid?
83-1 One half of a fresh cantaloupe
83-2 One serving of baked lima beans
83-3 Two scrambled eggs
83-4 A boiled potato
83-5 A glass of milk
84. Which of the following procedures is helpful in retaining the shape of fruits during the cooking process?
84-1 Add sugar at the beginning of the cooking period.
84-2 Add sugar at the end of the cooking period.
84-3 Cook rapidly.
84-4 Cook in a large amount of water.
85. Which one of these foods does not support normal growth and health when used as the only source of protein?
85-1 Dried skim milk
85-2 Navy beans
85-3 Cheese
85-4 Powdered eggs
85-5 Whole milk
86. Frances is buying a two- to three-pound chicken to fry for Sunday dinner. Which of these characteristics will be the most certain indication that the fowl is a young bird?
86-1 Smooth skin, yellow rather than bluish
86-2 Pliable breastbone
86-3 Pin feathers
86-4 Plump breast
86-5 Well-developed thighs
87. If a housewife is selecting a can of peas to be used for cream of pea soup, which one of the following items of information on the label will be most helpful to her in making the best selection?
87-1 Canned in Blrdville, Va.
87-2 Running Brook Brand
87-3 Seasoned with salt and spice
87-4 Size 3
87-5 Substandard
88. How many grams are there in a pound?

88-1 350
88-2 424
88-3 454
88-4 500
88-5 524
89. Even though the diet is adequate in calcium, the body is incapable of normal use of calcium unless it also has an adequate supply of
89-1 iron.
89-2 iodine.
89-3 copper.
89-4 vitamins C and D.
89-5 vitamin A and thiamine.
90. Which combination of conditions would be best for winter storage of root vegetables such as carrots and beets?
90-1 Room temperature, dry, dark
90-2 Cool, somewhat moist, well-ventilated container
90-3 Cool, dry, dark
90-4 Room temperature, somewhat moist, tightly covered container
90-5 Somewhat moist, dark, tightly covered container
91. There is a popular misconception about the meaning of the term acidosis. It usually refers to
91-1
91-2 surplus of acid-forming substances after food is burned in the cells.
91-3 acid reaction of the secretion of the salivary glands.
91-4 acid condition of the urine.
92. Boiled cabbage cut in wedges should be started to cook
92-1 two hours before serving time.
92-2 an hour before serving time.
92-3 a half-hour before serving time.
92-4 about 15 minutes before serving time.
93. A pound of sifted flour contains

93-1 one cup.
93-2 two cups.
93-3 three cups.
93-4 four cups.
93-5 five cups.
94. How many cups are there in a No. $2 \frac{1}{2}$ can?

94-1 One-half
94-2 One and one-half
94-3 Two and one-half
94-4 Three and one-half
94-5 Four and one-half
95. Martha tried to make a Devil's Food cake by using her favorite three-egg golden cake recipe and adding two squares of melted chocolate. The cake was an uninteresting light brown color rather than the rich reddish brown she expected. Why did this happen?
95-1 She used baking powder as a leavening.
95-2 She used too little chocolate.
95-3 She mixed the baking powder with the flour.
95-4 She did not use soda.
95-5 She stirred the batter too long.

Caution: Note that in items $96-100$, the wording of the question is negative. Do not overlook the word not in the question.
96. Which of these foods is not appropriate for freezing according to present methods used in the United States?
96-1 Beans
96-2 Carrots
96-3 Peaches
96-4 Raspberries
96-5 Tomatoes
97. If biscuits are to be flaky, the fat used in making them must not be
97-1 solid.
97-2 melted.
97-3 cut in with knives.
97-4 rubbed in with the fingers.
98. Which of the following foods should not appear on a tray for a person for whom the doctor has prescribed a light diet?
98-1 Custards
98-2 Cream soups
98-3 Celery stuffed with cheese
98-4 White rice
98-5 Eggs cooked without fat
99. The milling process removes certain nutrients from grain products, but some of these are restored through enrichment. Which nutrient is not restored by this process?
99-1 Iron
99-2 Protein
99-3 Thiamine
99-4 Riboflavin
99-5 Niacin
100. It is not in harmony with the purpose of the Federal Food, Drug, and Cosmetic Act to require that a package contain a product
100-1 of the kind that it purports to contain.
100-2 of the quantity that it purports to contain.
100-3 free from deterioration.
100-4 of the highest quality of its kind.
100-5 free from unwholesome additions.

## 115

- 9 -

Items 101-104: Which piece of silver is usually considered appropriate for eating each food listed below?

1. Fork
2. Bouillon spoon
3. Soup spoon
4. Teaspoon
5. None
6. Buttered peas
7. Scalloped corn
8. Consommé served in a cup
9. Sliced bananas served in a sauce dish

Items 105-110: For each statement below, select from the list given the term to which the statement applies.

Terms used in Cooking

1. Boil
2. Braise
3. Roast
4. Sauté
5. Simmer
6. To cook in any quantity of liquid below the boiling point
7. To cook in dry heat in the oven
8. To brown quickly in a small amount of fat, with frequent turning
9. To brown in a small amount of fat and then cook slowly in covered utensil in juices from meat or in added liquid
10. Best way to cook pork chops
11. Best way to cook eggs for salad

Items 111-116: Mr. and Mrs. Jones and their daughter Mary are entertaining Mr. and Mrs. Brown and their son Bob at dinner, which is to be served at 6:30. The covers are placed as shown in the diagram below. Mary will serve the main course on plates brought in from the kitchen. Her mother will pour the coffee at the table, and Mary will serve it to the people at the table.

111. When should the Browns plan to arrive?

111-1 5:45
111-2 6:00
111-3 6:15
111-4 6:25
111-5 6:30
112. If Mrs. Jones is to sit at place A, where should Mr. Jones sit?
112-1 Place B
112-2 Place C
112-3 Place D
112-4 Place E
112-5 Place F
113. Where should Mrs. Brown sit?

113-1 Place B
113-2 Place C
113-3 Place D
113-4 Place E
113-5 Place $F$

116. Which one of the diagrams above shows the placing of the napkin that is considered preferable by most authorities?

Items 117-122: After Alice had studied meal planning, she asked her mother if she might plan and prepare dinners at home. Her mother said she could, but pointed out that careful planning would be necessary because Alice got home only an hour before the time that the family usually ate dinner.
Below are listed four menus that Alice planned, followed by a series of questions about the menus.

## Menu 1

Rib Roast of Beef
Scalloped Potatoes
Buttered Cabbage
Bread Butter
Fruit Cup
Coffee or Milk

Menu 3
Creamed Chipped Beef on Toast
Frozen Peas Cauliflower Mixed Green Salad Bread Butter Chocolate Nut Pudding Coffec or Milk

## Menu 2

Baked Macaroni and Cheese
Boiled Potatoes
Banana and Nut Salad
Biscuits Butter
Apple Jelly
Cottage Pudding
Coffee or Milk

## Menu 4

Clear Tomato Soup
Cabbage Salad
Carrot Strips Celery Bread Butter

Baked Apple
Coffee or Milk
117. Which meal provides the most calories?
118. Which menu includes the most expensive source of protein?
119. Which meal provides the best variety of food values, colors, flavors, and textures?
120. In which meal is the color most monotonous?
121. Which menu would be improved most if sliced cold meat and potato salad were substituted for the salad listed?
122. Which meal contains the most foods of similar textures?

Items 123-128: Which type of leavening produces the major effect when used in each of the products mentioned below?

## Types of Leavening

1. Air
2. Carbon dioxide from baking powder
3. Carbon dioxide from yeast
4. Steam
5. Meringues
6. Muffins
7. Plain cup cakes
8. Angel food cake
9. Raised doughnuts
10. Popovers

Items 129-140: The following luncheon is to be served to six persons at 12:30 by Mrs. Jones, who does all of her own work. She has a gas stove with an oven and a pressure sauce pan.

## Menu <br> Baked Macaroni and Cheese <br> Buttered Beans (frozen) Lettuce and Tomato Salad <br> Baking Powder Biscuits Butter <br> Fruit Cup <br> Hot Tea

Select, from the list below, the time period that would be the best for doing each of the tasks listed at the right.

## Time Periods

1. Before 11 o'clock
(3 tasks)
2. Between 11 and 12 o'clock (3 tasks)
3. Between 12 and $12: 20$ o'clock (4 tasks)
4. Last 10 minutes before serving (2 tasks)
5. Pour ice water and place butter on table.
6. Put macaroni on to cook in boiling water.
7. Place biscuits in oven to bake.
8. (lean salad ingredients.
9. Prepare macaroni and cheese for baking.
10. Cook beans.
11. Prepare fruit cup and return it to refrigerator to chill.
12. Mix and shape biscuits.
13. P'ut water on to boil for tea.
14. Set table.
15. Arrange salads, add dressing, and place on table.
16. Put macaroni and cheese dish in oven to bake.

If you finish before the time is up, you
may go back and work on either part.

80. 4, 6, 7, 3, 2, 8, 9. Square the fourth number and subtract the third unless the fourth is odd and the fifth even; in that event square the fourth and subtract the second; in either case add 1 unless the first number is a multiple of 3 in which case add 2. Indicate the answer which is numbered the same as the result.
81. 16, 4, 1, 6, 24, 6, 3, 8, 32,
(2) 8 and 4
(3) 8 and 5 (4) 29 and 34
(5) 8 and 2
82. $1440,240, \ldots, 12,4$. What number should appear in the blank?
(1) 16
(2) 24
(3) 20
(4) 48
(5) 72
83. If $\mathbf{3}$ is $\mathbf{6 \%}$ of a number, what is the number?
(1) 30
(2) 90
(3) 50
(4) 15
(5) 31
84. A neophyte is a:
(1) worm
(2) rock formation
(3) planet
(4) beginner
(5) soldier
85. Furtive means about the same as:
(1) distant
(2) stealthy
(3) wicked
(4) removed
(5) advanced
86. $1,5,2,3,15,12,13$, ... The next number would be:
$\begin{array}{lllll}\text { (1) } 14 & \text { (2) } 10 & \text { (3) } 60 & \text { (4) } 65 & \text { (5) } 45\end{array}$
87. Intimidate is to frighten as entreat is to:
(1) beseech
(2) mollify
(3) introduce
(4) give
(5) seek
88. Pulchritude means:
(1) well-dressed
(2) new
(3) overly large
(4) physical beauty
(5) out of season
89. To covenant is to:
(1) imitate
(2) contract
(3) discover
(4) negotiate
(5) fulfill
90. A sodality is $\mathbf{a}$ :
(1) fellowship
(2) sex offense
(3) hard substance
(4) fight
(5) drink
91. $20 / 4$ is to 4 as 45 is to:
(1) $4 / 20$
(2) 180
(3) 360
(4) 36
(5) 72
92. What is the average rate per hour of a vehicle that travels $\mathbf{4 0 3 . 2}$ miles in $\mathbf{3}$ hours and $\mathbf{1 2}$ minutes?
(1) 132.3
(2) 134.4
(3) 47.1
(4) 126
(5) 101.2
93. $3,19,2,6,9,31,17$. If the square root of the second number is greater than the cube root of the fifth, square the third and subtract the first; if not, square the first and subtract the third unless the first is odd, in which case square the fourth and subtract the sixth. Indicate the answer which is numbered the same as the resulting difference.
94. $360,72, \ldots, 6,3$. What number should appear in the blank?
(1) 18
(2) 9
(3) 36
(4) 12
(5) 15
95. A recrudescent disease is:
(1) fatal
(2) non-recurring
(3) active again
(4) not curable
(5) caused by filth
96. $33,28, \ldots, 21,19, \ldots$. What two numbers should appear in the blanks?
(1) 23 and 17
(2) 26 and 14
(3) 24 and 18
(4) 25 and 16
(5) 23 and 15
97. A rapacious person is:
(1) hasty
(2) boisterous
(3) delighted
(4) greedy
(5) pleasing
98. An obsequious person is:
(1) popular
(2) servile
(3) wealthy
(4) open-minded
(5) witty
99. $6,3,4,16,8,5,6,24,12, \ldots . \quad . \quad$ What two numbers should come next?
(1) 9 and 10
(2) 15 and 16
(3) 9 and 36
(4) 13 and 52
(5) 6 and 7
100. Sexagesimal pertains to:
(1) sex
(2) the number 60
(3) the number 16
(4) elderly people
(5) yachting

## DIRECTIONS TO STUDENTS

Do not turn this page until directed to do so.
No marks of any kind are to be made on this test booklet. Answers are to be marked on a separate answer sheet, where there is also room for any rough figuring you may need to do.
Failure to observe the following rules may lower your score:

- If you were given a special pencil to use in recording your responses on the answer shect, that pencil must be used.
- If you are using the IBM answer sheet which requires you to mark your answers by filling in spaces between dotted lines, be sure to make each mark heavy and black. Mark only one answer for each question. If you change your answer, you must erase the first mark completely. Then mark your corrected choice.
- If you are using the self-marking answer sheet, you will indicate your answers by marking an $\mathbf{X}$ in a small box numbered the same as the answer of your choice. Mark only one answer for each question. Use some pressure in making your $\mathbf{X}$ so it will be sure to register. If you wish to change an answer on these answer sheets, do not erase your first answer but simply draw a circle around it. Then mark your corrected choice.
- Attempt to answer each question. Do not spend too much time on any one question; if a given question puzzles you, go on to the next one, which may be easier. You may guess at the right answer if you think you know it, but if you have no idea what the right answer is, avoid wild guessing and omit the question.
- As you work on the test, keep your place on the answer sheet. Make certain that the answer you are marking is numbered the same as the item you are answering.

The three practice exercises below are given so that you may see how to do the test.

## Practice 1.

## Oak is a kind of:

(1) wood
(2) stone
(3) metal
(4) glass
(5) liquid

Which word tells what oak is? Yes, wood is the answer. This answer has been correctly marked for you on the answer sheet.

## Practice 2.

1, 2, 3, 4, 5, ...., .... What two numbers should come next?
(1) 1 and 2
(2) 9 and 1
(3) 10 and 7
(4) 22 and 20
(5) 6 and 7

On your answer sheet, mark the answer you think is correct. You should have marked response number 5 for practice question 2 , since the answer (5) is correct.

## Practice 3.

Scales are to fish as wool is to:
(1) cotton
(2) sheep
(3) birds
(4) silk
(5) lakes

What is the number of the best answer? Mark the response space numbered the same as the answer you think is correct. You should have marked number 2 for practice question 3 , since scales are to fish as wool is to sheep.

You will have 40 minutes to work on this test. Do not begin work until you are told to do so.
(1) firmness
(2) surface
(3) duplicity
(4) expression (5) ease
61. Ambiguous is about the opposite of:
(1) definite
(2) small
(3) genuine
(4) enigmatic
(5) perpetual
62. 3, 14, 5, 12, 8, 2. If Christmas and New Year invariably fall on the same day of the week, square the first number and subtract half the second; if not, square the third number and subtract twice the fourth. Indicate the answer numbered the same as the difference.
63. The difference between two numbers is $1 / 4$. Their sum is 1 . What are the two numbers?
(1) $6 / 8$ and $2 / 8$
(2) $1 / 4$ and $3 / 4$
(3) $1 / 2$ and $1 / 4$
(4) $2 / 8$ and $3 / 8$
(5) $3 / 8$ and $5 / 8$
64. Superlative means:
(1) superior
(2) unlimited
(3) the lowest
(4) sensitive
(5) unlike
65. 3, 9, 12, 36, 39, 117, ....... What two numbers should come next?
(1) 120 and 360
(2) 120 and 234
(3) 234 and 236
(4) 351 and 354
(5) 121 and 363
66. A debonair person is:
(1) wealthy
(2) old
(3) hungry
(4) courteous
(5) disillusioned
67. A lucid question is:
(1) debatable
(2) clear
(3) lengthy
(4) difficult
(5) important
68. By how much must 12 be increased to stand in the same ratio to 21 as $\mathbf{3 0}$ does th 35 ?
(1) 6
(2) 9
(3) 3
(4) 14
(5) 5
69. John had $\$ 120$. He spent part of his money and now has only $\mathbf{\$ 1 5}$. What per cent of his money did he spend?
(1) $921 \%$
(2) $893 / 10$
(3) $91 \frac{1}{5}$
(4) 85
(5) $871 / 2$
70. Viniculture is to vines as aviculture is to:
(1) trees
(2) bees
(3) birds
(4) farming
(5) fish
71. To embellish is to:
(1) deface
(2) beautify
(3) destroy
(4) blind
(5) publish
72. A discerning person is:
(1) intrepid
(2) immune
(3) discriminating
(4) radical
(5) fearful
73. To disdain is to:
(1) pity
(2) check
(3) despise
(4) discard
(5) challenge
74. Hypocrisy is a form of:
(1) gambling
(2) worship
(3) sham
(4) government
(5) surgery
75. If the square root of forty-nine less the square root of two is a number less than the square of three, indicafe the first answer; if it is more, indicate the fifth answer.
76. A decibel measures:
(1) electric current
(2) temperature
(3) walking distance
(4) volume of sound
(5) readability
77. Heinous is to odious as commendable is to:
(1) secret
(2) affable
(3) perplexing
(4) laudable (5) act
78. A precocious child is:
(1) sickly
(2) fretful
(3) angelic
(4) advanced
(5) awkward
79. $3,6,8,24,27,108, \ldots$. What number should appear in the blank?
(1) 432
(2) 112
(3) 324
(4) 132
(5) 216

1. A person of integrity is:
(1) upright
(2) neutral
(3) prejudiced
(4) ungainly
(5) profound
2. To delude is to:
(1) mislead
(2) carry away
(3) bring
(4) seek
(5) demand
3. If a silver kopek is worth $\mathbf{4 0} \boldsymbol{\phi}$, how many kopeks can one buy for $\mathbf{\$ 2 1 6}$ ?
(1) 540
(2) 360
(3) 864
(4) 5400
(5) 3600
4. $6,12, \ldots, 27,36,46$. What number should appear in the blank?
(1) 18
(2) 19
(3) 24
(4) 15
(5) 14
5. Acute means:
(1) permeable
(2) mighty
(3) morose
(4) inadequate
(5) keen
6. To diverge is to:
(1) come together (2) amuse (3) branch off (4) plant (5) agree
7. 19, 16, 14, $11,9,6, \ldots . \ldots$. What two numbers should come next?
(1) 3 and 0
(2) 3 and 1
(3) 4 and 1
(4) 8 and 11
(5) 5 and 2
8. Conservative is the opposite of:
(1) vigilant
(2) liberal
(3) reserved
(4) inherent
(5) discriminative
9. A stripling is a:
(1) voter (2) highlander (3) tribesman (4) youth (5) vassal
10. An ingenious person is:
(1) vehement (2) stately (3) noble (4) sinless (5) inventive
11. A synopsis is a:
(1) nerve part (2) disease (3) refutation (4) condensation (5) preface
12. Vigilant is the opposite of:
(1) negligent
(2) tactful
(3) pungent
(4) typical
(5) rampant
13. $1,2,4,8,16,32$,
........ What two numbers should come next?
(1) 36 and 40
(2) 58 and 59
(3) 33 and 34
(4) 48 and 64
(5) 64 and 128
14. Revoke is to cancel as elude is to:
(1) refer (2) embark (3) await (4) evade (5) exalt
15. An azure sky is:
(1) clouded
(2) threatening
(3) reddish
(4) starry
(5) blue
16. Arabian is to horse as Bengal is to:
(1) tiger
(2) sheep
(3) Arabia
(4) vegetable
(5) Africa
17. The sum of two numbers is 5 ; their product is 0 . What are the two numbers?
(1) 212 and $2 \prime 2$
(2) 2 and 3
(3) 0 and 5
(4) 5 and 10
(5) $\frac{1 / 2}{2}$ and $5 \frac{1 / 2}{2}$
18. If the square of six less the square of four is an odd number divisible by 5 , indicate the third answer; if not, indicate the fifth answer.
19. If the sum of the squares of the successive odd numbers from $\mathbf{1}$ to $\mathbf{5}$ inclusive is less than seven times six, indicate the second answer; if more, indicate the third answer.
20. Meticulous is to slovenly as turbulent is to:
(1) noisy
(2) awesome
(3) desirable
(4) peaceful
(5) vacillating
21. What per cent of $\$ 400$ is $\mathbf{4} \%$ of $\$ 500$ ?
(1) $16 \% / 3 /$
(2) $5 \%$
(3) $10 \%$
(4) $2 \%$ \%
(5) $3 \%$
22. If three plus five is greater than seven and less than nine, indicate the fifth answer unless six is greater than five, in which case indicate the first answer.
23. Base is to noble as lewd is to:
(1) noisy
(2) think
(3) coarse
(4) chaste
(5) sensitive
24. $1529,1478,1427,1376,1325$,

What number should come next?
(1) 1274
(2) 1275
(3) 1254
(4) 1225
(5) 1224
44. $\%$ are how many thirds?
(1) 3
(2) $3 \frac{3}{5}$
(3) $2 \%$
(4) $2 \frac{1}{5}$
(5) $1 \frac{1}{6}$
45. Diamond is to jewel as gold is to:
(1) ring
(2) silver
(3) element
(4) mine (5) plentiful
46. Resuscitate is to revivify as copy is to:
(1) imitate
(2) originate
(3) model
(4) prepare
(5) serve
47. A bauble is $\mathbf{a}$ :
(1) mistake
(2) model
(3) cup
(4) trinket (5) shawl
48. A seismograph records:
(1) music
(2) blood pressure
(3) writing
(4) speed
(5) quakes
49. $11,7,10,12,24,20,23,25$, . The next number should be:
(1) 21
(2) 50
(3) 28
(4) 27
(5) 5
50. One who is deft is:
(1) careful
(2) dumb
(3) skillful
(4) hard of hearing
(5) destructive
51. Dissonance is a term most often used in:
(1) art
(2) music
(3) law
(4) medicine
(5) sociology
52. A trite saying is:
(1) commonplace
(2) brilliant
(3) short
(4) unusual
(5) witty
53. To recapitulate is to:
(1) take
(2) offend
(3) solve
(4) surrender
(5) summarize
54. Excruciating means about the same as:
(1) returning
(2) leaving
(3) assembling (4) exhibiting
(5) torturing
55. $20,18,24,8,6,12,4, \quad$. What two numbers should come next?
(1) 2 and 8
(2) 6 and 12
(3) 2 and 4
(4) 8 and 16
(5) 2 and 6
56. Anger is to violence as love is to:
(1) caress
(2) hate
(3) temper
(4) hope
(5) happiness
57. $88,76,74,62,60,48, \ldots$. What number should appear in the blank?
(1) 36
(2) 50
(3) 52
(4) 98
(5) 46
58. Defray is to expense as discharge is to:
(1) cancel
(2) obligation
(3) salary
(4) weapons
(5) surface
59. 7, 4, 8, 5, 10, 7,

What two numbers should come next?
(1) 4 and 8
(2) 11 and 8
(3) 13 and 10
(4) 12 and $S$
(5) 14 and 11
21. To blight is to:
(1) shine
(2) disappear
(3) ruin
(4) compress
(5) ignore
22. House residence President United White of called States the of the the the is If these words were arranged to make a good sentence, what would be the first letter of the second word in the sentence?
(1) H
(2) $\mathbf{p}$
(3) 0
(4) r
(5) t
23. $93,82, \ldots, 63,55,48$. What number should appear in the blank?
(1) 71
(2) 70
(3) 74
(4) 75
(5) 72
24. An eccentric person is:
(1) dishonest
(2) thrifty
(3) skeptical
(4) peculiar
(5) foolish
25. Oblivion is a state of:
(1) worry
(2) fear
(3) poverty
(4) forgetfulness
(5) thanksgiving
26. Reimburse is to embezzle as regurgitate is to:
(1) steal
(2) swallow
(3) specify
(4) count (5) revivify
27. Premeditation involves:
(l) sleeping
(2) curing
(3) planning (4) looking back
(5) hesitation
28. To metamorphose is to:
(1) leap
(2) see
(3) occupy (4) liken
(5) change
29. If eight is less than nine but more than six, indicate the fifth answer; if less than nine and less than six, indicate the fourth answer.
30. $9,18,15,30,27, \ldots .$. What two numbers should come next?
(1) 24 and 21
(2) 64 and 61
(3) 54 and 108
(4) 54 and 51
(5) 36 and 33
31. 9, $10,5,6,3,4, \ldots, \ldots$ What two numbers should come next?
(1) 3 and 4
(2) 1 and 2
(3) 2 and 3
(4) 8 and 9
(5) 5 and 2
32. Ponderous means:
(1) concise (2) impotent (3) unconscious (4) weighty (5) mischievous
33. $3,18,6,36,12, \ldots$. What two numbers should come next?
(1) 72 and 9
(2) 72 and 26
(3) 72 and 36
(4) 72 and 24
(5) 72 and 432
34. 13, 19, ... 34, 43, ... What two numbers should appear in the blanks?
(1) 25 and 52
(2) 28 and 49
(3) 2.4 and 33
(4) 26 and 53 (5) 25 and 53
35. A bulwark is a:
(l) marker
(2) fortification
(3) monument
(4) scaffold
(5) guidepost
36. $1,4,9,16,25,36, \ldots$, What two numbers should come next?
(1) 48 and 61
(2) 49 and 64
(3) 39 and 54
(4) 41 and 46
(5) 49 and 65
37. A supercilious person is:
(1) monstrous
(2) illicit
(3) humble
(4) miserly
(5) arrogant
38. Sodden means:
(1.) upturned
(2) grassy
(3) worthless
(4) leaden
(5) soaked

## 39. To be apathetic is to be:

(1) enthused
(2) informed
(3) ignorant
(4) indifferent
(5) sincere


HOUGHTON MIFFLIN COMPANY

# JOHNSON home economics INTEREST INVENTORY 

By HILDEGARDE JOHNSON

Form MS for Machine Scoring

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# Johnson Home Economics Interest Inventory 

By<br>HILDEGARDE JOHNSON<br>Associate Professor of Home Economics Education<br>Iowa State College<br>PROFESSOR HESTER CHADDERDON, Consultant<br>Iowa State College

INSTRUCTIONS: This inventory will help you to know whether or not your interests are similar to those of women employed in a number of occupations in the field of home economics. It is not a test since there are no right or wrong answers. Any answer is right if it expresses your honest reaction.

1. To start, insert an IBM Response Sheet in the Inventory with one column extending beyond the Inventory. See that the lines on page 3 of the Inventory and on the extreme right column of the IBM Sheet match. After responding to the first 30 items, turn the page of the Inventory and pull the IBM Sheet out far enough to match the page 4 column with page 4 of the Inventory. Each time you turn a page of the Inventory, pull the answer sheet out farther.
2. Use the electrographic pencil provided with the Inventory.
3. Record responses only on the IBM Sheet. Find the number on the IBM Sheet which corresponds to the number of the item in the Inventory. For each item there are five "response spaces" on the IBM Sheet, and these "response spaces" are lettered or numbered. Select one response for each item and fill in the "response space" for the response with a solid black pencil mark. Do not leave stray marks on the Response Sheet.
4. Record your first reaction to each item. If you make a mistake and mark the wrong space, erase the mark completely before marking the correct space.
5. Consider each item by itself, forgetting about your responses to other items. You do not have to be consistent.
6. Be frank and honest. Avoid indicating an interest in an item just because you think you ought to. There are no right or wrong answers.
7. In cases where you cannot base your response on experience, indicate what you think your response would be.
8. Respond to every item.
9. Fill in just one "response space" for each item, the one that is closest to the way you feel.

There are three sections of the Inventory: A, B and C, each with separate directions for responding to items. These directions appear on the page opposite the beginning of each section.

## 130

## INSTRUCTIONS FOR PART A

(Items l-153)

The following statements are activities and responsibilities of women employed in home economics positions.

After reading the statement carefully, ask yourself this question -
"Would I like to engage in this activity or assume this responsibility?"
If you have never had any experience with the activity, respond according to whether or not you think you would like it.

Blacken the space on the IBM Sheet according to the following code:
In space "LM" if you like very much doing or think you would like very much doing the activity described in that item.

In space "L" if you like doing or think you would like doing it.
In space " $I$ " if you are neutral in your reaction or do not know whether you would like to do the activity listed. Use this space as little as possible.

In space " D " if you dislike doing or think you would dislike doing the activity.
In space "GD" if you greatly dislike doing or think you would greatly dislike doing the activity.

Summary of code: LM Like very much
L Like
I Indifferent, or do not know .
D Dislike
GD Greatly dislike

## Sample response:

O. Do hair cutting, hair dressing, give shampoos, manicures, and facials.


The sample item above has been marked to indicate dislike. Now proceed to the next page and mark according to the directions above.

The code to responses is printed on each left page. Refer to it frequently.


1. Arrange displays in windows
2. Help commercial firms to put their product before the public
3. Prepare or supervise the preparation of exhibits
4. Help children to develop good food habits
5. Arrange for such details of a demonstration as connecting appliances and the printing of programs.
6. Write newspaper articles
7. Help to fit each employee into the right job
8. Study continually the changing habits, customs, and needs of people in various sections of the country in order to know my audience.
9. Create ideas or things
10. Select large and expensive pieces of equipment as well as small items
11. Conduct fashion shows, arranging for the music, lighting, and programs as well as selecting models and ensembles
12. Keep records
13. Participate in committees which are planning for product improvement or advertising programs. Represent the woman's point of view
14. Use arithmetic, work with figures
15. Supervise salespeople

## PAGE 3

16. Identify and distinguish between various textiles
17. Be responsible for the maintenance of high standards of cleanliness
18. Give talks to community groups of adults
19. Conduct sales training classes
20. Give radio talks
21. Demonstrate homemaking techniques to rural homemakers, frequently with improvised equipment.
22. Teach adolescents
23. Hire, train, and maintain a working force
24. Select fabrics and design costumes that will enhance the appearance of various types of women
25. Find the reasons for proft and loss in my department or business
26. Be responsible for financial management; including budget making, the maintenance of a system which controls waste, and the analyzing of profit and loss statements
27. Write articles for professional magazines
28. Attend fashionable restaurants, style shows, the opera and other places where well dressed people gather, to study popularity of fashions.
29. Give talks before mothers' clubs, civic, and professional groups
30. Be able to help children at a period in their lives which is probably most influential in determining

Code to responses: LM Likeverynugh
I Likdifergat, or do not know
D Dishike
GD Greatly dislike

## Mark responses in column for page 4. Match the lines.

31. Help a patient to plan for his special diet, considering his income, time and equipment.
32. Talk to salesmen about the value and uses of a product or how to promote sales of equipment
33. Analyze records of the rent, delivery charges, advertising, and display charges for your department
34. Make the plans for the improvement of the home economics department in a school
35. Create original dress designs by draping fabric on a dressmaker form
36. Direct preparations for teas, dinners, receptions, banquets, and other social events
37. Eat with different groups of rural people each day at their community meetings
38. Think up new tricks to make a product sell
39. Help individuals with problems of home management
40. Choose ensembles of gowns, hats, bags, shoes, and gloves for store dummies
41. Help individuals of all classes with their personal dietary problems
42. Help communities plan a school lunch program
43. Estimate food allowances necessary for the maintenance of good health for people other than my family
44. Make rapid plans for the serving of a group of people you had not expected
45. Talk to individual consumers about how to use their equipment efficiently.

## PAGE 4

46. Write reports for special diet allowances to relief organizations
47. Help others to take responsibility for leadership in a group activity $\qquad$
48. Assist advertisers in the preparation of advertising or publicity copy
49. Train lay people in rural communities so that they can give lectures and demonstrations
50. Plan meals for hospital patients using only the foods allowed in the diet list prescribed by the physician.
51. Develop sound ways of using the products of specific producers
52. Work largely with people who have less than high school education
53. Spend days shopping for material of a certain color or texture for a dress I am designing
54. Keep advertisers happy without lowering my professional standards
55. Participate in community programs for the improvement of home life.
56. Accept children when they are "bad" as well as when they are "good".
57. Arrange for photographs to illustrate written material
58. Build a radio program keeping in mind what people want and what they need
59. Take technical information and put it into the language of the woman in the home
60. Help young children take part in the mealtime, rest hour, and housekeeping at nursery school

61. Keep records of children's day-to-day behavior
62. Write an article for publication on the spur of the moment
63. Develop sales resistance to protect my department or business
64. Make practical tests of new equipment
65. Talk to parents individually about the guidance of their children
66. Select merchandise for a department in a store
67. Help young children to develop new skills and abilities
68. Make out orders for food supplies and equipment
69. Read and correct proof of newspaper articles.
70. Compute the cost of materials used in a gown
71. Help young children understand other children
72. Keep the sales staff informed about fashion
73. Plan ways to use the resources of the community in teaching
74. Teach patients how to prepare their special diets at home
75. Deal with customers who are hard to please
76. Be the first to wear the very latest fashions
77. Prepare posters and other illustrative material
78. See the results of guidance of children
79. Instruct employees in personal hygiene and sanitation
80. Visit competitors, know what they are doing
81. Give information to salespeople about the things they are selling
82. Promote good will between customers and the company
83. Plan menus which will attract customers
84. Anticipate the demands of the public for a product or service.
85. Teach people on relief how to keep in good health
86. Help parents understand pre-school children
87. Start with any job I can get with a good fashion company
88. Manage the food service so that a profit is made
89. Help individuals to select furnishings for their homes


Mark responses in column for page 6. Match the lines.
92. Teach a homemaker how to use a new
vacuum cleaner ...................
93. Supervise preparation and serving of food.
94. Watch young children as they learn to do new things
95. Sketch costumes
96. Help individuals plan household budgets
97. Laugh with children at their jokes
98. Interpret the consumer's wants to the company
99. Standardize recipes to control quality, yicld, and cost.
100. Help people to make their food money go as far as possible
101. Help to coordinate the activities of the schoo: and community
102. Give homemaking advice to women in their homes
103. Observe what customers buy and what they do not buy
104. Interview patients about food preferences
105. Plan and give demonstrations to large group.

PAGE 6
106. Answer homemakers' questions by phone
107. Serve on school or community committees
108. Conduct a question-and-answer department in a newspaper
109. Combine fabrics of interesting textures and colors
110. Supervise cleaning of kitchen equipment
111. Prepare bulletins, pamphlets, or booklets
112. Make chemical analyses of foods
113. Discuss nutrition problems with professional groups
114. Plan work schedules and work procedures for employees
115. Read manuscripts and decide which ones to publish
116. Plan furnishings and decorations for rooms
117. Cater to an "ever-unpredictable" public
118. Describe the same product in many different phrases
119. Prevent waste in my department, kitchen, or business
120. Work with fabrics that are exquisite in design and texture

121. Study shop windows for new ideas
122. Direct a playground for children
123. Deal with ideas
124. Borrow frequently for personal use
125. Teach student nurses.
126. Train 4-H girls for con tests at fairs.
127. Make a department budge
128. Prepare dinner for guest at home.
129. Design clothes
130. Visit the homes of girls I am teaching.
131. Conduct group discussior
132. Test products in a test kitchen
133. Be considered an authority in my field.
134. Keep records of cost of food
135. Experiment with the effect of colors.

## PAGE 7

136. Buy on the wholesale market
137. Think up new ideas continually
138. Keep within a departmental budget.
139. Teach small children to play games.
140. Prepare food for photographing
141. Prepare bulletins on style trends
142. Plan menus for use in institutions
143. Write radio scripts
144. Interview clients $\qquad$
145. Try new recipes
146. Handle emergencies ....
147. Teach homemakers
148. Anticipate style trends.
149. Wait on tables.
150. Design new fabrics

## 149

Ttems 151, 152, 153.

153. Thin
154. Work
155. Wot:
156. Work
157. Worn
158. Work
159. Work
160. Dea:
161. Work
162. Work and the people with whom you may work and associate. After reading the item care fully, ask yourself the question.
"Would this characteristic of a job help to make me satisfied or dissatisfied?"

Code to responses: HD Highly desirable characteristic of a job
D Desirable characteristic of a job
NI Vot important characteristic of a job
U L'ndesirable characteristic of a job
HU Highly undesirable characteristic of a job

Code to responses: HD Tighly destrabe chroctenistic of a job

## D

NI
U Undentable
HU Tighly undesirable
(Items 151-221)
163. Work
164. Job in
165. Work
$\longrightarrow$
166. Work
167. Work
168. $W_{\text {ork }}$
169. Work
1i0. $W_{\text {ork }}$
171. $W_{\text {ork }}$
172. $W_{\text {ork }}$
1i3. $W_{\text {ork }}$
174. $W_{\text {ork }}$
175. Work $^{2}$
${ }^{176}$. Work
$\begin{array}{ll}\text { 1i7. } & \text { Work } \\ \text { 1i8. } & \\ \text { A job }\end{array}$
lịg.
151. Compile material for leaflets, cookbooks, canning books, and recipe sets $\qquad$
152. Rearrange and redecorate rooms
153. Think up new things for small children to do

PART B. Read Instructions on opposite page betore going ahead.
154. Work which would make it possible for me to specialize in one phase of home economics, such as clothing, or foods, or art
155. Work requiring long hours frequently under pressure to meet a deadline.
156. Work in a chemistry laboratory or in a laboratory in which there are experimental animals
157. Work in which I must not let the irritating behavior of small children bother me
158. Work in which I begin as a saleswoman, then advance to a better job
159. Work in which I would be expected to do things in the community in addition to my regular job
160. Deai with employee problems which require much patience and forbearance
161. Work in which I am responsible for creative ideas but someone else carries out the details of these ideas
162. Work providing nine months of postgraduate training at a salary which covers maintenance.
163. Work in which I can help the homemaker to make her home convenient and attractive
164. Job in which competition is keen between my co-workers and me
165. Work in which I must make many decisions without having the help of more experienced people

## PAGE 8

166. Work in which I must keep up to date on trends such as styles and prices
167. Work in which many people show appreciation for the help I give them
168. Work in which I am responsible for large quantity food preparation
169. Work that gets me down to a child's level so that I see things the way he does
170. Work in which there is a constant demand on my creative energies
171. Work in which attendance at national meetings is an aid to advancement
172. Work that involves helping people learn to get along well with others
173. Work in which it is possible to experiment with new methods or materials
174. Work that gives me an opportunity to help people to improve their family life.
175. Work with people who enjoy food almost to the extent of "living to eat"
176. Work largely by myself or conferring with one person at a time
177. Work which provides on-the-job training throughout my professional career
178. A job in which I manage my own department
179. A job which involves close contacts with people who are suffering
180. Work in which I must sell myself and my ideas

Code to responses: HD Highly desirable characteristic of a job
D Desiable
NI Not important
U Undesiable
HU Aighly undesirable
181. Work in which I can sponsor clubs for young people $\therefore$
182. Work that would bring me in contact with community groups
183. Work in which maintenance of customer good will is essential
184. Work in which it is possible to see definite change in people.
185. Work in which it is necessary to be on my feet most of the time
186. Work with methodical and systematic people
187. Work with carelessly dressed people. $\qquad$
188. Work with rural people $\qquad$
189. Work with people of different racial groups
190. Work in which there is a great variety of activities
191. Work that is for twelve months with only a two-week vacation
192. Work which demands imagination and resourcefulness
193. Work in which women can be smartly dressed on the job
194. Work which involves association with both adults and children
195. Work which contributes to the discovery of something new
196. Work in which I have contact with top executives
197. Work in which my name and activities are publicized by the press
198. Work that will allow me to express my own individuality
199. Work in which I can help underprivileged people
200. Work which allows association with others in the fashion field.
201. Work in which I can take pride in the neatness of my reports.
202. Work that necessitates rapid production.
203. Work that is filled with glamour and excitement
204. Work in which I can help people who are ill $\qquad$
205. Work in which I can do some selling .
206. Work that can be done in an informal, home-like atmosphere
207. Work that uses a strong background in science
208. Work in which I can wear a uniform
209. Work in which my creative ideas are absorbed by the company
210. Work that is with all classes of people

Items 211-221

Code to responses: HD Highly desirable charactertstic of a job
D Desjrable
NI Not jmportant
U
HU Alighly undesirable

## INSTRUCTIONS FOR PART C

(Items 222-300)
The following job characteristics, activities, subjects in the school curriculum or jobs are grouped so that you may consider several items at once and rank them in the order of your degree of interest in them. In some groups there are three items, in some four and in some five.

Read over a group of items, select the item which is your first choice and fill in the first space opposite it. Then select your remaining choices in order of your interest in them.

Sample response:
1st 2nd 3rd 4th 5th
572. Tell a story. (Second choice)
573. Listen to a story. (First choice)
574. Write a story. (Third choice) . . . . . . . . . . . . . .
575. Illustrate a story. (Fifth choice) $\qquad$
576. Dramatize a story. (Fourth choice)

Even if you do not like any of the items in a group, you will dislike some less than the others. Put them in the order of your interest in them.
211. Work that requires continued education for advancement
212. Work with people who are very responsive to what I wear
213. Work that includes all phases of home economics
214. Work in which there are opportunities for community service.
215. Be constantly aware of customer reaction
216. Work in which I can influence children
217. Work that I can do with my hands
218. Work in which facility with words is required
219. Work that is with people rather than things
220. Work in which I must dramatize situations
221. Work that requires accuracy
A. PARTC. Read instructions on opposife page before going ahead.

Indicate your 1st, 2nd and 3rd choices
222. Work in which definite results can be seen each day
223. Work in which definite results can be seen after several months of work
224. Work in which results are hard to see because changes in people are involved.

Indicate your 1 st , 2 nd , 3 rd and 4 th choices
225. Work with pre-school children

## PAGE 10

226. Work with grade school children
227. Work with adolescents
228. Work with adults

Indicate your 1st, 2nd, 3rd and 4th choices
229. Read scientific literature
230. Read about historic costume
231. Read about problems and methods of child guidance
232. Read about the psychology of advertising

Indicate your 1st, 2nd, 3rd and 4th choices
233. Work that is largely with adolescent boys
234. Work that is largely with men
235. Work that is largely with adolescent girls
236. Work that is largely with women

Indicate your 1st, 2nd, 3rd and 4th choices
237. Work under the direction of an experienced person
238. Work independently, carrying out my own ideas
239. Work in which there is opportunity to develop executive ability
240. Work in which I am responsible for directing the work of other:
Sample response: lst 2nd 3rd 4th 5th572. Tell a story. (Second choice)
$\square$573. Listen to a story. (First choice)-
574. Write a story. (Third choice)575. Illustrate a story. (Fifth choice)
576. Dramatize a story. (Fourth choice)
242. Live in a small town (500-2,500)
243. Live in a large town $(2,500-100,000)$
244. Live in a city ( $100,000-750,000$ )
245. Live in a very large city ( 750,000 and over) G.

Indicate your 1st, 2nd, 3rd, 4th and 5th choices
246. Work which requires little or no traveling
247. Travel to cities occasionally for meetings
248. Travel for a month or two out of each year to cities or large towns.
249. Travel most of the time, staying in hotels in cities
250. Day travel in rural areas, returning almost every night to my headquarters.
H.

Indicate your 1st, 2nd, 3rd, 4th and 5th choices
251. Study how to operate home equipment.
252. Study market conditions.
253. Study the theory and mechanics of refrigeration
254. Study the wants of the buying public
255. Study the psychology of personality.

## PAGE II

I. (Jobs)

Indicate your 1st, 2nd, 3rd, 4th and 5th choices
256. Food service director in a school
257. Competitive shopper $\qquad$
258. Playground supervisor $\qquad$
259. Demonstrator of the use of meat products.
260. County home demonstration agent.
J. (Jobs)

Indicate your 1st, 2nd, 3rd, 4th and 5th choices
261. Tearoom proprietor
262. Public health nutritionist
263. Radio home economist
264. Home consultant for an electric company.
265. Dress designer
K. (Jobs)

Indicate your 1st, 2nd, 3rd, 4th and 5th choices
266. Interior decorator
267. Dietitian
268. Editor of a woman's page.
269. Buyer $\qquad$
Sample response: ..... 1st 2nd 3rd 4th 5th572. Tell a story. (Second choice)573. Listen to a story. (First choice)574. Write a story. (Third choice)575. Illustrate a story. (Fifth choice)576. Dramatize a story. (Fourth choice)

Indicate your 1st, 2nd, 3rd, 4th and 5th choice 271. Study bookkeeping
272. Study chemistry
273. Study English compositic
274. Study economics
275. Study dramatics
M. (In School)

Indicate your 1 st , 2 nd , 3 rd, 4 th and 5 th choice 276. Study psychology
277. Study public speaking.
278. Study journalism
279. Study mathematics
280. Study physics
N. (In scheol)

Indicate your 1st, 2nd, 3rd, 4th and 5th choice
281. Study history
282. Study art $\qquad$
283. Study sociology $\qquad$
284. Study biology
285. Study literature

PAGE 12
O. (Jobs) 1 Indicate your 1st, 2nd, 3rd, 4th and 5th choice 286. Scientific research work.
287. Dressmaker $\qquad$
288. Caterer
289. Private secretary
290. Saleswoman
P. (Jobs)

Indicate your 1st, 2nd, 3rd, 4th and 5th choice
291. Statistician
292. YWCA secretary
293. Manager of a women's style shop
294. Illustrator
295. Vocational counselor Q. (Jobs)

Indicate your 1st, 2nd, 3rd, 4th and 5th choice
296. Purchasing agent
297. Sales manager

298 Laboratory technician
299. Hostess
300. Dean of women in high school or college.
$151$

## STUDENT EXPERIENCES IN FOODS AND NUTRITION

The purpose of this check list is to obtain information about your experiences which have been related to the study of foods. We are interested to learn where these have been carried on and your reasons for considering the activity.

Personal Information
Name
Address $\qquad$ rural $\qquad$ urban $\qquad$
Number in family brothers sisters $\qquad$
Your position in the family:
youngest $\qquad$ middle $\qquad$ oldest $\qquad$ other $\qquad$
Father's occupation
Does your mother work outside the home? Yes $\qquad$ No $\qquad$
If yes, what occupation?
Grade in school completed by mother $\qquad$ by father $\qquad$

## Experiences

1. In your high school homemaking
A. In what grades have you had homemaking in school? (10-50 points)

$$
8 \quad 10 \quad 10 \quad 11 \quad 12
$$

B. Did you do home experiences in foods and nutrition? (0-1)

No Yes $\qquad$ If yes, what were they? (List)
C. Certain experiences may have been emphasized in the foods and nutrition area of study during your high school homemaking courses. In the columns I, II, III, or IV, check each item according to your particular situation. ( $0-3$, each item)

|  | EXTENT OF |  |  |  | EMPHASIS |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  | ACTIVITIES | I | II | III | IV |
|  |  | None | Little | Some | Much |

Meal planning and preparation.

Selection and buying of foods.

Knowing and using nutritive value of
foods.
Preserving foods
Preparing meats
Preparing vegetables...
Preparing salads and
desserts.
Preparing baked products

Using new food
products
Using new methods
of preparation
Setting the table and serving food

Planning and preparing
foods for special
occasions
Measuring of ingredients $\qquad$

2. In your 4-H Club
A. How many years have you been a member of a 4-H club? (0-30 pts.)

None_1-3_4-6
More than 6
B. Did you have $4-\mathrm{H}$ projects in foods and nutrition? (0-1)


If yes, what were they? (List)
3. As a part of your home responsibilities

Home economics teachers as well as parents have encouraged the acceptance of responsibilities within the home as a part of the carry over of school learning to the home situation. In columns I, II, III, check each item according to your particular situation. (0-2, each item)

## TYPES OF <br> ACTIVITIES

## EXTENT OF PARTICIPATION

| I | II | III |
| :---: | :---: | :---: |
| Never | Occasionally | Frequently |

Meal planning and preparation

Selecting and buying
foods $\qquad$
Knowing and using nutrition value of
foods.
Preserving foods.
Preparing meats
Preparing vegetables.
Preparing salads and desserts

Preparing baked products

## Preparing new food

 productsUsing new methods of preparation

Setting the table and serving food $\qquad$
-

TYPES OF
ACTIVITIES

|  | EXTENT OF PARTICIPATION |  |
| :---: | :---: | :---: |
| I <br> Never | Occasionally | Frequently |

Planning and
preparing foods
for special
occasions
Selecting, caring
for, and using of
kitchen equipment

Others (List)
4. Other experiences related to foods and nutrition. Some experiences related to foods and nutrition may have been carried on by you during the high school training period. List any activities which have not been included in the previous questions. For example, working in school lunch room, having a job as a waitress in a restaurant, etc.

## Reason for Activities in Foods

Your activities as indicated in this checklist have been influenced by certain reasons. Some of these reasons are listed below. Check the statements which best describe the reasons for your activities in foods and nutrition.

[^18]5. I like to try new recipes and new products.
6. I like to experiment with foods.
7. I like to make foods look attractive.
8. My mother (or the cook) won't let me work in the kitchen.
9. I am too busy with other activities.
10. Others (List)

## FOODS AND NUTRITION INTEREST CHECKLIST

The following experiences have been included in the Home Economics 111 course, Principles of Food Preparation and Nutrition. Please indicate in the proper column, the degree to which your interest in food and nutrition was affected by each experience.

Direction: Use the following key to express your evaluation of the contribution of each of the experiences on your interest in Foods and Nutrition

If the experience:
Circle 1 - increased your interest greatly
2 - increased your interest slightly
3 - neither increased nor decreased your interest
4 - decreased your interest slightly
5.- decreased your interest greatly

| EXPERIENCES | DEGREE OF INTEREST |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| l. Preparing a single food in a variety of ways. | 1 | 2 | 3 | 4 | 5 |
| 2. Preparing foods in ways that are different from the ways to which you have been accustomed. | 1 | 2 | 3 | 4 | 5 |
| 3. Preparing dishes typical of this area with its French and Spanish influence in food preparation (gumbo, rice dressing, dishes for fast days)............................... | 1 | 2 | 3 | 4 | 5 |

$$
\mid
$$

| EXPERIENCES | DEGREE OF INTEREST |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 4. Preparing foods that are different from those to which you are accustomed (avocado, acorn squash, broccoli, brussel sprouts) | 1 | 2 | 3 | 4 | 5 |
| 5. Learning to like foods that are unusual or prepared in unusual ways..................... | 1 | 2 | 3 | 4 | 5 |
| 6. Judging foods according to accepted standards in order to understand why certain results are obtained in the final product. | 1 | 2 | 3 | 4 | 5 |
| 7. Comparing different methods of preparation and their resulting products. (Dry heat vs. moist heat for meats, quick mix method vs. conventional for cakes......... | 1 | 2 | 3 | 4 | 5 |
| 8. Observing the effect of different ingredients on the product obtained. (tenderizer on meat, sugar on fruits, increase or decrease of fat and/or sugar on baked products, acid or alkaline reaction on color pigments in vegetables) | 1 | 2 | 3 | 4 | 5 |
| 9. Comparing new food products with traditional ones. (Precooked rice, instant potatoes, bread or cake mixes). | 1 | 2 | 3 | 4 | 5 |
| 10. Using appropriate garnishes to make food more attractive in appearance..................... | 1 | 2 | 3 | 4 | 5 |

$$
1
$$

11. Using combinations of foods that make them more appealing in appearance and flavor. (Pork chops with fried apple rings, ham with pineapple and yams)

1 2 34 5
12. Using local food products in various ways. (Rice, yams)

12345
13. Using various types of small and large food preparation equipment. (Including automatic equipment)

12345
14. Observing demonstrations on the use of ranges and other equipment
15. Observing demonstrations on food preparation techniques

12345
16. Using knowledge of nutrition in improving personal eating habits to meet recommended nutritional requirements
17. Applying ideas, knowledge and abilities gained from the course in food preparation and meal service at home.

12345
18. Discussing current nutritional problems and ways they might be overcome

12345
19. Organizing responsibilities within the group so that each person shares in all the activities

12345
20. Managing the use of time and energy in the laboratory in order to keep on schedule...... $1 \begin{array}{llllll} & 2 & 3 & 4 & 5\end{array}$

EXPERIENCES
21. Assuming personal responsibility in keeping the unit kitchen in order.............
22. Understanding and using basic principles in food preparation. (Starch cookery, emulsions, sugar cookery, protein cookery, etc.)
23. Recognizing (or being recognized for) personal achievement in food preparation

12345
24. Using personal initiative or creative ability in preparing and serving attractive, tasty, nourishing food

12345
25. Using a variety of reference materials, books and magazines--related to foods and nutrition.

12345
26. Using individual study to solve problems relating to nutrition and food study

12345
RATING SHEET FOR LABORATORY WORK IN FOOD PREPARATION
NAME


| $\begin{aligned} & \hline \text { POINTS TO } \\ & \text { CONSIDER } \end{aligned}$ | 132 | 5 6 6 7 7 | 910 SCORE |
| :---: | :---: | :---: | :---: |
| 4. Condition of working area | Confusion; dishes and utensils in disorder; makes no attempt to prevent unnecessary cleaning | Not orderly, but working space made available when needed; some effort made to care for dishes used; makes some attempts to prevent unnecessary cleaning | Orderly; minimum number of dishes used; soiled dishes rinsed and stacked, put to soak and washed as used; protects working surface to prevent unnecessary cleaning |
| 5. Ability to follow directions | Inattentive; insufficient knowledge of technical <br> vocabulary to follow directions; makes no effort to follow instructions given | Spasmodically attentive; some knowledge of technical vocabulary; makes some attempt to follow instructions given | ```Attentive, readily inter- prets necessary technical vocabulary; follows instruc- tions given``` |
| 6. Care of supplies and equipment after use | Supplies and equipment not replaced or in order in desk and cupboards; dishes and equipment not washed clean; stoves left dirty | Some effort made to replace supplies and equipment; stoves and dishes left in reasonably good order | Supplies, equipment replaced; desk and stoves clean and in good order |



[^19]
## Appendix B

Additional Data
Table 10. Cooperative Test--control section

| Subject \# | Raw Score Form Y | Raw Score Form X | Score Y | $Y^{2}$ | Score X | $\mathrm{x}^{2}$ | $\begin{aligned} & \text { Dif } \\ & \mathrm{X}-\mathrm{Y} \end{aligned}$ | Dif ${ }^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 34 | 52 | 16.9 | 285.61 | 40.8 | 1664.64 | 23.9 | 571.21 |
| 2 | 59 | 61 | 40.2 | 1616.04 | 46.1 | 2125.21 | 5.9 | 34.81 |
| 3 | 60 | 55 | 40.8 | 1664.64 | 43.2 | 1866. 24 | 2.4 | 5.76 |
| 4 | 66 | 80 | 43.9 | 1927. 21 | 59.7 | 3564.09 | 15.8 | 249.64 |
| 5 | 49 | 61 | 35.7 | 1274.49 | 46.1 | 2125.21 | 10.4 | 108.16 |
| 6 | 59 | 55 | 40.2 | 1616.04 | 43.2 | 1866.24 | 3.0 | 9.00 |
| 7 | 37 | 49 | 19.2 | 368.64 | 39.6 | 1568.16 | 20.4 | 416.16 |
| 8 | 43 | 47 | 24.8 | 615.04 | 38.5 | 1482.25 | 13.7 | 187.69 |
| 9 | 64 | 67 | 42.7 | 1823.29 | 50.0 | 2500.00 | 7.3 | 53.29 |
| 10 | 46 | 57 | 33.5 | 1122.25 | 44.2 | 1953.64 | 10.7 | 114.49 |
| 11 | 50 | 56 | 35.9 | 1288.81 | 43.7 | 1909.69 | 7.8 | 60.84 |
| 12 | 39 | 47 | 20.7 | 428.49 | 38.5 | 1482. 25 | 17.8 | 316.84 |
| 13 | 52 | 48 | 36.5 | 1332.25 | 39.2 | 1536.64 | 2.7 | 7.29 |
| 14 | 39 | 56 | 20.7 | 428.49 | 43.7 | 1909.69 | 23.0 | 529.00 |
| 15 | 30 | 29 | 13.8 | 190.44 | 20.7 | 428.49 | 6.9 | 47.61 |
| 16 | 61 | 82 | 40.1 | 1608.01 | 61.7 | 3806.89 | 21.6 | 466.56 |
| 17 | 66 | 74 | 44.0 | 1936.00 | 55.3 | 3058.09 | 11.3 | 127.69 |
| 18 | 42 | 48 | 23.0 | 529.00 | 39.2 | 1536.64 | 16.2 | 262.44 |
| 19 | 51 | 72 | 36.0 | 1296.00 | 53.9 | 2905.21 | 17.9 | 320.41 |
| Total |  |  | 608.6 | 21350.74 | 847.3 | 39289.27 | 238.7 | 3888.89 |
| Mean |  |  | 32.03 |  | 44.9 |  | 12.56 |  |
| $\mathrm{M}^{2}$ |  |  | 1025.9209 |  | 1988.2681 |  | 157.7532 |  |
| SD |  |  | 10.16 |  | 9.17 |  | 7.04 |  |

Table 11. Cooperative Test--experimental section

| $\underset{\#}{\text { Subject }}$ | Raw Score Form Y | Raw Score Form X | Score Y | $Y^{2}$ | Score X | $\mathrm{x}^{2}$ | $\begin{aligned} & \text { Dif } \\ & \mathrm{X}-\mathrm{Y} \end{aligned}$ | Dif ${ }^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 52 | 66 | 36.5 | 1332.25 | 49.4 | 2440.36 | 12.9 | 166.41 |
| 2 | 48 | 51 | 34.3 | 1176.49 | 40.6 | 1648.36 | 6.3 | 39.69 |
| 3 | 42 | 58 | 23.0 | 529.00 | 44.7 | 1998.09 | 21.7 | 470.89 |
| 4 | 71 | 75 | 46.8 | 2190.24 | 56.1 | 3147.21 | 9.3 | 86.49 |
| 5 | 63 | 54 | 42.1 | 1772.41 | 42.4 | 1797.76 | . 3 | . 09 |
| 6 | 44 | 54 | 24.6 | 605.16 | 42.4 | 1797.76 | 17.8 | 316.84 |
| 7 | 48 | 56 | 34.5 | 1190.25 | 43.7 | 1909.69 | 9.2 | 84.64 |
| 8 | 56 | 72 | 38.6 | 1489.96 | 53.9 | 2905. 21 | 15.3 | 234.09 |
| 9 | 47 | 71 | 34.0 | 1156.00 | 53.2 | 2830.24 | 19.2 | 368.64 |
| 10 | 59 | 74 | 40.2 | 1616.04 | 55.3 | 3058.09 | 15.1 | 228.01 |
| 11 | 41 | 54 | 22.3 | 497.29 | 42.4 | 1797.76 | 20.1 | 404.01 |
| 12 | 49 | 66 | 35.7 | 1274.49 | 49.4 | 2440.36 | 13.7 | 187.69 |
| 13 | 37 | 62 | 19.2 | 368.64 | 46.8 | 2190.24 | 27.6 | 761.76 |
| 14 | 41 | 31 | 22.3 | 497.29 | 22.3 | 497.29 | 0 | 0 |
| 15 | 76 | 78 | 49.5 | 2450.25 | 58.5 | 3422. 25 | 9.0 | 81.00 |
| 16 | 29 | 51 | 13.0 | 169.00 | 40.6 | 1648.36 | 27.6 | 761.76 |
| 17 | 35 | 66 | 17.7 | 313.29 | 49.4 | 2440.36 | 31.7 | 1004.89 |
| 18 | 61 | 72 | 40.1 | 1608.01 | 53.9 | 2905.21 | 13.8 | 190.44 |
| 19 | 52 | 57 | 36.5 | 1332.25 | 44.2 | 1953.64 | 7.7 | 59.29 |
| 20 | 37 | 57 | 19.2 | 368.64 | 44.2 | 1953.64 | 25.0 | 625.00 |
| Total |  |  | 630.1 | 21936.95 | 933.4 | 44781.88 | 303.2 | 6071. 63 |
| Mean |  |  | 31.51 |  | 46.67 |  | 15.16 |  |
| M ${ }^{2}$ |  |  | 992.8801 |  | 2178.0889 |  | 229.8256 |  |
| SD |  |  | 10.46 |  | 8.01 |  | 8.81 |  |

Table 12. Johnson Interest Inventory--control

| $\begin{gathered} \text { Subject } \\ \# \end{gathered}$ | $\begin{aligned} & \text { Before } \\ & \text { Score (A) } \end{aligned}$ | $\mathrm{A}^{2}$ | $\begin{aligned} & \text { After } \\ & \text { Score (B) } \end{aligned}$ | B ${ }^{2}$ | $\begin{aligned} & \text { Dif } \\ & (B-A) \end{aligned}$ | Dif ${ }^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 1166 | 1359556 | 1168 | 1364224 | +2 | 4 |
| 2 | 1164 | 1354896 | 1098 | 1205604 | -66 | 4356 |
| 3 | 1092 | 1192464 | 1103 | 1216609 | +11 | 121 |
| 4 | 1163 | 1352569 | 1147 | 1315609 | -16 | 256 |
| 5 | 1125 | 1265625 | 1139 | 1297321 | +14 | 196 |
| 6 | 1189 | 1413721 | 1170 | 1368900 | -19 | 361 |
| 7 | 1089 | 1185921 | 1102 | 1214404 | +13 | 169 |
| 8 | 1194 | 1425636 | 1164 | 1354896 | -30 | 900 |
| 9 | 1198 | 1435204 | 1204 | 1449616 | $+6$ | 36 |
| 10 | 1198 | 1435204 | 1216 | 1478656 | +18 | 324 |
| 11 | 1109 | 1229881 | 1216 | 1478656 | +107 | 11449 |
| 12 | 1151 | 1324801 | 1159 | 1343281 | +8 | 64 |
| 13 | 1084 | 1175056 | 1117 | 1247689 | +33 | 1089 |
| 14 | 1129 | 1274641 | 1146 | 1313316 | +17 | 289 |
| 15 | 1104 | 1218816 | 1071 | 1147041 | -33 | 1089 |
| 16 | 1263 | 1595169 | 1285 | 1651225 | +22 | 484 |
| 17 | 1190 | 1416100 | 1144 | 1308736 | -46 | 2116 |
| 18 | 1150 | 1322500 | 1152 | 1327104 | +2 | 4 |
| 19 | 1232 | 1517824 | 1276 | 1628176 | +44 | 1936 |
| Total | 21990 | 25495584 | 22077 | 25711063 | 87 | 25243 |
| Mean | 1157.36 |  | 1161.95 |  | 4.58 |  |
| SD | 50.23 |  |  |  | 37.15 |  |

Table 13. Johnson Interest Inventory--experimental
$\begin{array}{cl}\text { Subject } & \text { Before } \\ \text { \# } & \text { Score }\end{array}$

| $\begin{gathered} \text { Subject } \\ \# \end{gathered}$ | Before Score (A) | $A^{2}$ | $\begin{aligned} & \text { After } \\ & \text { Score (B) } \\ & \hline \end{aligned}$ | $\mathrm{B}^{2}$ | $\begin{aligned} & \text { DiI } \\ & (B-A) \end{aligned}$ | Dif ${ }^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 1191 | 1418481 | 1240 | 1537600 | +49 | 2401 |
| 2 | 1092 | 1192464 | 1091 | 1190281 | -1 | 1 |
| 3 | 1100 | 1210000 | 1099 | 1207801 | -1 | 1 |
| 4 | 1111 | 1234321 | 1156 | 1336336 | $+45$ | 2025 |
| 5 | 1118 | 1249924 | 1121 | 1256641 | +3 | 9 |
| 6 | 1112 | 1236584 | 1141 | 1301881 | +29 | 8410 |
| 7 | 1172 | 1373584 | 1129 | 1274641 | -43 | 1849 |
| 8 | 1140 | 1299600 | 1157 | 1338649 | +17 | 289 |
| 9 | 1147 | 1315609 | 1178 | 1387684 | +31 | 961 |
| 10 | 1110 | 1232100 | 1094 | 1196836 | -16 | 256 |
| 11 | 1117 | 1247689 | 1101 | 1212201 | -16 | 256 |
| 12 | 1129 | 1274641 | 1116 | 1245456 | -13 | 169 |
| 13 | 1144 | 1308736 | 1125 | 1265625 | -19 | 361 |
| 14 | 1173 | 1375929 | 1122 | 1258884 | -51 | 2601 |
| 15 | 1218 | 1483524 | 1125 | 1265625 | -93 | 8649 |
| 16 | 1135 | 1289225 | 1080 | 1166400 | -55 | 3025 |
| 17 | 1125 | 1265625 | 1126 | 1267876 | +1 | 1 |
| 18 | 1140 | 1299600 | 1140 | 1299600 | 0 | 0 |
| 19 | 1076 | 1157776 | 1092 | 1192464 | +16 | 256 |
| 20 | 1193 | 1423249 | 1178 | 1387684 | -15 | 225 |
| Total | 22743 | 25888661 | 22611 | 25590165 | -132 | 31745 |
| Mean | 1137.15 |  | 1130.55 |  | -6.6 |  |
| SD | 37.32 |  | 37.90 |  | 40.31 |  |

Table 14. Experience survey scores--both sections

| Control |  |  | Experimental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Subject \# | Raw Score | $X i^{2}$ | Subject \# | Raw Score | Xi² |
| 1 | 70 | 4900 | 1 | 83 | 6889 |
| 2 | 94 | 8836 | 2 | 69 | 4761 |
| 3 | 122 | 14884 | 3 | 96 | 9216 |
| 4 | 101 | 10201 | 4 | 95 | 9025 |
| 5 | 90 | 8100 | 5 | 84 | 7056 |
| 6 | 47 | 2209 | 6 | 93 | 8649 |
| 7 | 90 | 8100 | 7 | 71 | 5041 |
| 8 | 56 | 3136 | 8 | 139 | 19321 |
| 9 | 107 | 11449 | 9 | 129 | 16641 |
| 10 | 106 | 11236 | 10 | 104 | 10816 |
| 11 | 114 | 12996 | 11 | 61 | 3721 |
| 12 | 76 | 5776 | 12 | 102 | 10404 |
| 13 | 83 | 6889 | 13 | 87 | 7569 |
| 14 | 106 | 11236 | 14 | 65 | 4225 |
| 15 | 16 | 256 | 15 | 111 | 12321 |
| 16 | 76 | 5776 | 16 | 51 | 2601 |
| 17 | 125 | 15625 | 17 | 44 | 1936 |
| 18 | 27 | 729 | 18 | 74 | 5476 |
| 19 | 104 | 10816 | 19 | 78 | 6084 |
|  |  |  | 20 | 16 | 256 |
| Total | 1610 | 153150 |  | 1652 | 152008 |
| Mean | 84.73 |  |  | 82.60 |  |
| SD | 30.50 |  |  | 28.61 |  |

Table 15. Henmon-Nelson scores--both sections

| Control |  |  | Experimental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Subject \# | Raw Score | Xi2 | Subject \# | Raw Score | Xi2 |
| 1 | 37 | 1369 | 1 | 41 | 1681 |
| 2 | 23 | 529 | 2 | 40 | 1600 |
| 3 | 32 | 1024 | 3 | 30 | 900 |
| 4 | 43 | 1849 | 4 | 40 | 1600 |
| 5 | 43 | 1849 | 5 | 34 | 1156 |
| 6 | 48 | 2304 | 6 | 20 | 400 |
| 7 | 48 | 2304 | 7 | 37 | 1369 |
| 8 | 42 | 1764 | 8 | 42 | 1764 |
| 9 | 50 | 2500 | 9 | 43 | 1849 |
| 10 | 34 | 1156 | 10 | 51 | 2601 |
| 11 | 25 | 625 | 11 | 49 | 2401 |
| 12 | 31 | 961 | 12 | 29 | 841 |
| 13 | 33 | 1089 | 13 | 23 | 529 |
| 14 | 37 | 1369 | 14 | 36 | 1296 |
| 15 | 34 | 1156 | 15 | 66 | 4356 |
| 16 | 38 | 1444 | 16 | 28 | 784 |
| 17 | 47 | 2209 | 17 | 29 | 841 |
| 18 | 43 | 1849 | 18 | 43 | 1849 |
| 19 | 57 | 3249 | 19 | 40 | 1600 |
|  |  |  | 20 | 49 | 2401 |
| Total | 745 | 30599 |  | 770 |  |
| Mean | 39.21 |  |  | 38.50 |  |
| SD | 8.78 |  |  | 10.69 |  |

Table 16. Rank positions of experimental section
on all factors and final rank

| Subject \# | $\operatorname{Exp}(\mathrm{a})$ | HN(b) | Coop(c) | JHEII(d) | $\begin{aligned} & \text { Total } \\ & \text { (a-d) } \end{aligned}$ | Final Rank Position |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 11 | 8 | 7.5 | 3 | 29 | 5 |
| 2 | 15 | 9.5 | 10.5 | 19 | 53 | 16.5 |
| 3 | 6 | 15 | 14 | 18 | 53 | 16.5 |
| 4 | 7 | 9.5 | 2 | 16 | 34 | 7 |
| 5 | 10 | 14 | 3 | 13 | 40 | 8 |
| 6 | 8 | 20 | 13 | 15 | 56 | 18 |
| 7 | 14 | 12 | 10.5 | 5 | 41 | 9.5 |
| 8 | 1 | 7 | 6 | 8.5 | 22.5 | 2 |
| 9 | 2 | 5.5 | 12 | 6 | 25 | 3 |
| 10 | 4 | 2 | 5 | 17 | 28 | 4 |
| 11 | 17 | 3.5 | 15.5 | 14 | 49 | 14 |
| 12 | 5 | 16.5 | 9 | 11 | 41 | 9.5 |
| 13 | 9 | 19 | 17.5 | 7 | 52 | 15 |
| 14 | 16 | 13 | 15.5 | 4 | 48 | 12.5 |
| 15 | 3 | 1 | 1 | 1 | 6 | 1 |
| 16 | 18 | 18 | 20 | 10 | 66 | 19.5 |
| 17 | 19 | 16.5 | 19 | 12 | 66 | 19.5 |
| 18 | 13 | 5.5 | 4 | 8.5 | 30 | 6 |
| 19 | 12 | 9.3 | 7.5 | 20 | 48 | 12.5 |
| 20 | 20 | 3.5 | 17.5 | 2 | 42 | 11 |

Table 17. 'Foods and Nutrition Interest Checklist'" scores--both sections

| Control |  |  | Experímental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Subject \# | Xi | Xi2 | Subject \# | Xi | Xi2 |
| 1 | 12 | 144 | 1 | 25 | 625 |
| 2 | 20 | 400 | 2 | 15 | 225 |
| 3 | 41 | 1681 | 3 | 33 | 1089 |
| 4 | 37 | 1369 | 4 | 16 | 256 |
| 5 | 27 | 729 | 5 | 27 | 729 |
| 6 | 36 | 1296 | 6 | 50 | 2500 |
| 7 | 28 | 784 | 7 | 39 | 1521 |
| 8 | 33 | 1089 | 8 | 48 | 2304 |
| 9 | 32 | 1024 | 9 | 28 | 784 |
| 10 | 44 | 1936 | 10 | 44 | 1936 |
| 11 | 45 | 2025 | 11 | 35 | 1225 |
| 12 | 37 | 1369 | 12 | 38 | 1444 |
| 13 | 33 | 1089 | 13 | 22 | 484 |
| 14 | 26 | 676 | 14 | 31 | 961 |
| 15 | 29 | 841 | 15 | 36 | 1296 |
| 16 | 45 | 2025 | 16 | 10 | 100 |
| 17 | 37 | 1369 | 17 | 37 | 1369 |
| 18 | 34 | 1156 | 18 | 45 | 2025 |
| 19 | 36 | 1296 | 19 | 28 | 784 |
|  |  |  | 20 | 46 | 2116 |
| Total | 632 | 22298 |  | 653 | 23773 |
| Mean | 33.26 |  |  | 32.65 |  |
| SD | 8.431 |  |  | 11.36 |  |

Table 18. Scores on 'Rating Sheet for Laboratory Work in Food Preparation"--both sections

| Control |  |  | Experimental |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Subject \# | Xi | Xi2 | Subject \# | X | Xi2 |
| 1 | 72 | 5184 | 1 | 81 | 6561 |
| 2 | 69 | 4761 | 2 | 67 | 4489 |
| 3 | 73 | 5329 | 3 | 66 | 4356 |
| 4 | 80 | 6400 | 4 | 74 | 5476 |
| 5 | 72 | 5184 | 5 | 63 | 3969 |
| 6 | 72 | 5184 | 6 | 70 | 4900 |
| 7 | 52 | 2704 | 7 | 67 | 4489 |
| 8 | 77 | 5929 | 8 | 77 | 5929 |
| 9 | 81 | 6561 | 9 | 77 | 5929 |
| 10 | 72 | 5184 | 10 | 80 | 6400 |
| 11 | 81 | 6561 | 11 | 58 | 3364 |
| 12 | 65 | 4225 | 12 | 68 | 4624 |
| 13 | 76 | 5776 | 13 | 60 | 3600 |
| 14 | 69 | 4761 | 14 | 51 | 2601 |
| 15 | 54 | 2916 | 15 | 80 | 6400 |
| 16 | 75 | 5625 | 16 | 61 | 3721 |
| 17 | 81 | 6561 | 17 | 75 | 5625 |
| 18 | 70 | 4900 | 18 | 79 | 6241 |
| 19 | 81 | 6561 | 19 | 66 | 4356 |
|  |  |  | 20 | 67 | 4489 |
| Total | 1372 | 100306 |  | 1387 | 97519 |
| Mean | 72.2 |  |  | 69.35 |  |
| SD | 8.16 |  |  | 8.156 |  |

Table 19. List of demonstrations and grades according to rank position

| Subject <br> Number | $\begin{aligned} & \text { Rank } \\ & \text { Position } \end{aligned}$ | Demonstration Title | Grade |
| :---: | :---: | :---: | :---: |
| 15 | 1 | Gelatin | A |
| 8 | 2 | Cream Puffs | A |
| 9 | 3 | Pastry | A |
| 10 | 4 | Gelatin | A |
| 1 | 5 | Biscuits | A |
| 18 | 6 | Use of Sponge Cakes in Desserts | B |
| 4 | 7 | Pastry | A |
| 5 | 8 | Roasting and Use of Meat Thermometer | C |
| 12 | 9.5 | Egg Cookery | B |
| 7 | 9.5 | Deep Frying of Foods | B |
| 20 | 11 | Egg Cookery | B |
| 14 | 12.5 | Coffee Ring | D |
| 19 | 12.5 | Deep Frying of Foods | B |
| 11 | 14 | Kneading and Shaping Rolls | A |
| 13 | 15 | Coffee Ring | B |
| 3 | 16.5 | Use of Sponge Cakes in Desserts | B |
| 2 | 16.5 | Cream Puffs | B |
| 6 | 18 | Cutting Poultry | B |
| 17 | 19.5 | Coffee Makers and Their Use | B |
| 16 | 19.5 | Roasting and Use of Meat Thermometer | C |

High 3.9

Middle 2.5

Low 3.0

| E | VG | G | F | P | COMMENTS |
| :--- | :--- | :--- | :--- | :--- | :--- |

The Demonstrator
Appearance--neat, clean, attractive, suitably dressed
Manner--well poised, at ease, self-assured, courteous, interested in subject
Speech--clear diction; voice-correct volume, pleasant, varied emphasis; correct grammar

Preparation for Demonstration
Room--temperature, lighting, chairs arranged so that demonstration can be seen and heard by all
Equipment and Supplies-suitable, practical, conveniently arranged for use
Illustrative Material--
suitable
Presentation
Introduction--audience motivated, purposes clearly stated
Information--accurate, complete, suitable to audience, practical
Manner of presentation--steps clear, accurate, and in consecutive order, coordination of talk and action
Technique--standards set and maintained, skillful, neatness of working surface, relative position to audience as they would use it
Finished Product--completed on
time, displayed, judged
Questions--invited at right time, repeated before answering
Summary
Steps reviewed, variations
suggested
E = Excellent

$$
\mathrm{G}=\mathrm{Good}
$$

G = Good

$$
\begin{array}{lll}
\text { VG } & =\text { Very Good } & P=\text { Poor } \\
F & =\text { Fair } &
\end{array}
$$

Table 20. List of special projects and grades according to rank position

| Subject Number | $\begin{aligned} & \text { Rank } \\ & \text { Position } \end{aligned}$ | Project Title | Grade |
| :---: | :---: | :---: | :---: |
| 15 | 1 | Cakes | C |
| 8 | 2 | One Dish Meals | B |
| 9 | 3 | Family Recipes, Revised, with History | A+ |
| 10 | 4 | Main Dishes, Evaluation and Revision | B |
| 1 | 5 | Recipe Collection, Tested and Evaluated | B |
| 18 | 6 | Menus and Menu Planning | A+ |
| 4 | 7 | Rice | A+ |
| 5 | 8 | Barbecues | A |
| 12 | 9.5 | Meal Planning | B |
| 7 | 9.5 | Meats | A |
| 20 | 11 | Pies and Pastry | A |
| 14 | 12.5 | Foreign Foods | D |
| 19 | 12.5 | Frozen Desserts | B |
| 11 | 14 | Gelatin | C |
| 13 | 15 | Cakes | A |
| 3 | 16.5 | Main Dishes | D |
| 2 | 16.5 | Creole and Cajun Cookery | B |
| 6 | 18 | Cookies | C |
| 17 | 19.5 | Home Freezing of Foods | C |
| 16 | 19.5 | Salads | C |

CRITERIA FOR JUDGING INDIVIDUAL PROJECTS

1. Is it within the ability of the student?
2. Is it of interest to the student?
3. Is it related to foods typical of the home or community?
4. Does it involve thinking, analyzing, experimentation, testing, practical experience?
5. Does it show initiative, creativity, resourcefulness?
6. Does it show a thorough acquaintance with the subject?
7. Does it show application of basic principles?
8. Have a variety of reliable, up-to-date resources been used?
9. Is it well organized and presented in a logical and acceptable manner (including good English usage, grammar, spelling, etc.)?
10. Is there evidence of adequate effort (extensive reading and research) in preparing and presenting the material?

Appendix C

Course Syllabus

Course Syllabus
Home Economics 111
Principles of Food Preparation
University of Southwestern Louisiana
1960-61

## INTRODUCTION

Home Economics 111, Principles of Food Preparation, is a one-semester course in beginning foods which is required for all freshmen home economics majors. There are no chemistry or nutrition prerequisites to the course; therefore, it must be taught on a more elementary level than if these courses preceded it. Simplification is necessary, and yet at the same time, some concepts of nutrition and chemistry are introduced in order that students may see the importance of these in application to food preparation. Also, because many of the students have had previous high school experience in foods and nutrition, it is necessary to provide instruction at a level which is challenging to their abilities and interests and, at the same time, give consideration to the needs of those students who have had no prior home economics training.

A one-hour period for lecture and discussion and two laboratory periods of two hours each are scheduled weekly.

The beginning course is followed by one in nutrition and another in meal management, both of which are included in the basic curriculum for all majors in home economics. Other offerings in foods and nutrition which may be elected or are required in specific professional curricula are:
advanced nutrition, diet and disease, food preservation, experimental cookery, advanced foods and gourmet cookery. The subject matter content and experiences of the course as it was taught in this study were planned primarily around basic facts and principles of food preparation and their application in relation to family meal situations. The method of presentation was not the "meal basis" as the term is usually used, but easily prepared items were frequently used as supplements to the main products to show possibilities in meal service. For example, while the meats were being prepared, accompanying quick cooking vegetables, instant rice, a salad and brown-and-serve rolls were prepared to be served with the meats following the evaluation of the products by the class.

Standards of quality for each type of food were used for evaluation of items prepared in the laboratory. When products did not measure up to standards, reasons for deficiencies were discussed in order to broaden the students: understanding of the principles involved.

A wide variety of foods and methods of preparation was used to increase experiences of students in the area.

While essentially the course was one in food preparation, restricting it only to that phase without including food selection, nutrition, and management would have been impossible. All of these aspects were emphasized as they pertained to the preparation of each type of food.

The experimental approach was recognized as valuable
when students have had chemistry prior to the course. Without this prerequisite, experimental activities were kept to a minimum and modified in terms of the student's ability.

For the study which was made to determine the effectiveness of adjusting experiences to individual levels of interest, ability and past experience, one of the two sections of the course taught during the 1960-1961 school year was designated as the control section and the other as the experimental section. The lecture and discussion periods for both sections were kept as closely the same as possible in regard to course content presented. Assignments for the control section were the same for all groups whereas, in the experimental section, there were opportunities for additional study within the ability range of the individual student.

In the experimental section, laboratory experiences were planned so that simple activities were assigned to those students with less training and ability while different and more complicated tasks were engaged in by the more advanced students. With some lessons, however, it was not possible to include experiences that differed too greatly. In fact, for the purposes of some particular lessons, it was necessary to keep the activities of the different groups closely similar.

The laboratory experiences for the control section were the same, or very similar, for all groups. In some instances, the same activities as those in the experimental
section were carried out by groups in the control section, but without regard to ability, interest and past experience, since students were randomly assigned to groups.

In the laboratory plans which follow, the groups in the experimental section are listed in order, from those with least ability (Group 1) to those with greatest ability (Group 5), as indicated by the devices used for determining their placement within the class.

Students in the experimental section assumed responsibility for class demonstrations, while the teacher was responsible for those in the control section.

The text was Justin, Rust and Vail's Foods. ${ }^{1}$ Food Preparation Recipes by Niles was the basic source of recipes used in the laboratory although this was supplemented from time to time. ${ }^{2}$

## Objectives of Course

1. To gain some knowledge and awareness of basic nutritional information as it is involved in the selection, preparation and service of foods for the family.
2. To gain knowledge and understanding of basic facts and information and to develop some ability to apply these in the selection, preparation, and service of foods.
$\mathrm{l}_{\text {Margaret }}$ M. Justin, Lucile Osborn Rust and Gladys E. Vail, Foods, 4th ed. (Boston: Houghton Mifflin Co., 1956).
${ }^{2}$ Kathryn Bele Niles, Food Preparation Recipes (New York: John Wiley and Sons, Inc., 1955).

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3. To develop some ability in the management of time, energy and materials in food preparation.
4. To increase interest in food preparation and nutrition as they apply in family living.

## INTRODUCTION TO NUTRITION

Lecture and Discussion: Both Sections

Brief Outline
I. Definitions of
A. Nutrition--providing adequately for the growth, maintenance and repair of the body
B. Food--substances which furnish energy for the body, build and repair body tissues, and regulate body processes
II. Main aspects of nutrition
A. Intake of dietary essentials
B. Relative need for dietary essentials
C. Body's ability to use them
III. General factors influencing nutrition
A. Body type
B. Physical and postural defects
C. Fatigue
D. Social and mental factors
E. Habits
F. Availability of food
G. Tradition and custom
H. Economic status
I. Knowledge of food needs
J. Personal likes and dislikes
IV. Indications of good nutrition
V. Basic food groups and daily requirements
A. Milk group

1. Children--3 to 4 cups
2. Teenagers--4 or more cups
3. Adults--2 or more cups
4. Pregnant women--4 or more cups
5. Nursing mothers--6 or more cups
B. Meat group--2 or more servings
C. Vegetable-fruit group--4 or more servings including
6. A dark green or deep yellow vegetable
7. A citrus fruit or other fruit or vegetable important for vitamin $C$
8. Other fruits and vegetables, including potatoes
D. Bread-cereals group--4 or more servings--whole grain, enriched or restored
VI. Functions of food in the body
A. Furnish energy
9. Carbohydrates--4 calories per gram
10. Fats--9 calories per gram
11. Protein--4 calories per gram
B. Build and repair
12. Proteins
13. Minerals
C. Regulate and protect
14. Minerals
15. Vitamins
16. Cellulose
17. Water
18. Protein
VII. Nutrients--their functions and food sources
A. Carbohydrates
B. Proteins
C. Fats
D. Minerals
E. Vitamins

Both sections read from current periodicals and reported in class on prevalent problems in nutrition.

Major Points of Emphasis

1. The nutritional status of an individual is determined by the intake and utilization of certain dietary essentials in adequate amounts.
2. The nutrients in the various food stuffs furnish energy, build and repair body tissues and regulate body processes.
3. A single nutrient may have more than one function in the body.
4. Many of the nutrients are interdependent upon each other in carrying on their functions: for example, vitamin $D$ and calcium.

## FRUITS

Lecture and Discussion: Both Sections

## Brief Outline

I. Importance in diet
A. Amount needed daily
B. Nutrients in fruits
C. Variety in flavor, color, texture in meals
II. Selection
III. Preparation
A. Conservation of nutrients with raw and cooked fruits
B. Prevention of discoloration
C. Cooking

1. Reasons
2. Desired form or texture--in water vs. sugar syrup
3. Maximum water absorption by dried fruits

Major Points of Emphasis

1. Ascorbic acid content will be decreased through oxidation when certain fruits are stored for a long period of time, or when peeled, cut and exposed to the air for
a time. Heat also is destructive to this vitamin.
2. Water soluble vitamins and minerals will be lost through soaking or cooking in excess amounts of liquid unless these liquids are used in the diet.
3. Tannins and flavone pigment in some fruits will oxidize and cause the cut fruit to darken when exposed to the air. Acid fruit juice sprinkled on these fruits prevents this oxidation.
4. Cooking fruits in a sugar syrup strengthens the cell structure and causes the fruit to retain its shape, whereas, cooking in water gives a sauce consistency.
5. Soaking in hot water for a short time or cooking over a slow fire aids in maximum absorption of water by dried fruits.

## LABORATORY--FRUITS

## Experimental Section

Each student sectioned 1 orange and $\frac{1}{2}$ grapefruit.

Group 1. In addition to the above, the group prepared:
a. Apple sauce-cooked with water and sugar added after cooking
b. Stewed apples-cooked in sugar syrup
c. Prunes

Group 2. Same as Group 1 except:
a. Higher proportion sugar used with stewed apples

Control Section

Each student sectioned 1 orange and $\frac{1}{2}$ grapefruit. Each group (of 4 students within a unit kitchen) prepared the same fruits as Group 1 in the experimental section.
b. Oranges combined with cocoanut and served as ambrosia.

Group 3. Same as Group 1
except:
a. Glazed apple rings
using cinnamon
candies for color
and flavor and corn
syrup in heavy
sugar syrup to prevent crystallization (instead of stewed apples)

Group 4. Same as Group 1
except:
a. Baked apples instead of stewed apples
b. Broiled grapefruit

Group 5. Same as Group 1 plus a
fruit plate arrangement
using oranges, prunes
and other fruits.

Demonstration:

1. Peeling and sectioning orange

Demonstration: Same as for experimental section
2. Peeling and slicing orange
3. Sectioning grapefruit
4. Peeling and coring apples
5. Coring apples for baking and for apple rings

Demonstration was given by teacher since students had not had time to prepare for a demonstration.

## ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS

## IN EXPERIMENTAL SECTION

## Fruit

1. Different way of serving (ambrosia) using additional ingredient and different type of serving utensil
2. Glazed apple rings:
more care in preparing apple rings and cooking to retain shape
syrup involved use of agent to prevent crystallization of syrup
3. Baked apples:
required faster work and technique of coring in order to have completely cooked within time
4. Broiled grapefruit: additional process different way of serving
5. Fruit plate: idea for serving that may be different creative ability in arranging

## SALADS AND SALAD DRESSINGS

Lecture and Discussion: Both Sections

## Brief Outline

## I. Salads

A. Importance of salads in diet

1. Nutritional value varies with ingredients
2. Contribution to variety in meals--color, flavor, texture
B. Types of salads in relation to place in meal-appetizer, main dish, accompaniment, dessert salad
C. Preparation
3. Salad greens--washing and chilling
4. Combination of ingredients
5. Size and shape of components
6. Marinating bland ingredients
7. Arrangement and garnish
D. Characteristics of standard products
II. Salad Dressings
A. Types
8. French
9. Mayonnaise
10. Cooked
B. Temporary vs. permanent emulsions
C. Factors influencing formation of emulsions
11. Emulsifying agent
12. Temperature of ingredients
13. Rapid beating
14. Amount of oil added at intervals
15. Separation and how to correct it

Major Points of Emphasis

1. The bland flavor of some ingredients (meat, fish, potatoes) is improved by marinating in French dressing.
2. Loss of ascorbic acid through oxidation can be prevented by preparing fruits for salad just before serving or sprinkling them with an acid fruit juice.
3. An increase in temperature of a liquid lowers its surface tension; therefore, ingredients of mayonnaise at room temperature will form an emulsion more easily than those at refrigerator temperature.
4. The presence of an emulsifying agent decreases the surface tension of the oil so that the other liquids surround the oil droplets more easily in the formation of an emulsion.
5. Rapid agitation disperses the oil in finer droplets, thus aiding in the formation of a more stable emulsion.

## LABORATORY I--FRUIT SALADS AND MAYONNAISE

Experimental Section

Each group made mayonnaise.

Group 1. Carrot-PineappleRaisin Salad

Group 2. Citrus and Avocado Salad

Group 3. Fresh Pineapple
Spears, Melon Balls, Blue Plums

Group 4. Fruit Souffle Salad (Using commercial gelatin dessert product)

Group 5. Twenty-Four Hour
Salad

Control Section

Each group made mayonnaise.

Group 1. Carrot-PineappleRaisin Salad

Group 2. Grapefruit and Stuffed Prune Salad

Group 3. Ambrosia Salad (sliced oranges, bananas, cocoanut)

Group 4. Waldorf Salad (apples, celery, dates, nuts)

Group 5. Mixed Fruit Salad (apples, oranges, bananas, grapes)

## ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS <br> IN EXPERIMENTAL SECTION

1. Additional techniques in preparing melon balls and fresh pineapple spears.
2. Souffle salad involved more complex recipe, more careful time management in order to chill gelatin and allow time for salad to set.
3. Twenty-Four Hour Salad required that a cooked dressing be made. This also required better time management, assuming that more advanced group would work more quickly and could take advantage of previous learnings relating to protein cookery.

## LABORATORY II--VEGETABLE AND MEAT SALADS

| Experimental Section | Control Section |
| :--- | :--- |
| 1. Vegetable Salad Bowl |  |
| 2. The same salads were |  |
| celery and carrot | made in the control group, as |
| curls, cauliflower, | in the experimental group. |
| pickles, green | Experience with a variety of |
| pepper rings | salads was felt to be an |
| 3. Stuffed Tomatoes | important objective for this |
| with Shrimp Salad | lesson. While different types |
| 4. Potato Salad | of salads were made, experi- |
| 5. Tuna-Macaroni | ences for the different groups |
| Salad | within the class were closely |

Demonstration (by teacher) in both groups: carrot and celery curls, radish roses, salad plate luncheon.

## ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION

1. Salads assigned to more advanced groups included more different ingredients and more preparation procedures to be accomplished within the allotted time. Differences between groups were not too great, however.
2. Experience with varieties of salads was felt to be an important objective in this lesson.

## VEGETABLES

## Lecture and Discussion: Both Sections

Brief Outline
I. Importance in diet
A. Amount needed daily
B. Nutrients in vegetablesC. Variety in color, flavor, texture, method ofpreparation and service in meals
II. Classification according to
A. Keeping quality
B. Color
C. Flavor
D. Carbohydrate content
III. Selection
IV. Preparation
A. Conservation of nutrients
B. Preservation of color
C. Retention of optimum flavor
V. Characteristics of standard products
Major Points of Emphasis

1. The retention of nutrients in vegetables may be influencedby :
A. Amount of water used
B. Length of cooking time
C. Starting and cooking temperature of the water
D. pH value of the cooking liquid
E. Size of food particles
F. Method of cooking
2. Color retention in vegetables is influenced by the pH value of the cooking medium, the solubility of the pigment, and the presence of certain minerals.
A. Chlorophyll changes to an olive drab color in an acid medium while the presence of an alkali intensifies it.
B. Flavones remain colorless in an acid medium, but become yellow in the presence of alkalies.
C. Carotinoids are very little affected by the pH value of the cooking water.
D. Anthocyanins are red in the presence of an acid but become blue in alkaline water. They are quite soluble in water.
E. Iron salts react with flavones to form dark colored compounds.
3. Flavors of vegetables differ; some are unstable compounds. It is desirable to retain some flavors and to modify others.

Experimental Section

1. Buttered Brussel Sprouts Stuffed Baked Potatoes
2. Mashed Sweet Potatoes

Deluxe
Peas and Scallions
3. Buttered Asparagus

Glazed Butterscotch
Yams
4. Buttered Spinach with

Egg Garnish
Corn Pudding
5. Broccoli with Mustard

Sauce
Scalloped Potatoes

## Control Section

The same vegetables were prepared by the control group. Here again, as with the salads, experiences were closely similar, and variety, both in types of vegetables and methods of preparation, were considered important.

## LABORATORY II --VEGETABLES

## Experimental Section

1. Cauliflower with Grated

Cheese
Buttered Carrots
2. Baked Bean Casserole

Buttered Turnips
3. Seven Minute Cabbage

Baked Acorn Squash
4. Harvard Beets

Stuffed Baked Summer
Squash
5. Green Beans

Sautéed Egg Plant

Demonstration of use of
pressure cooker by
students.

Control Section

The same vegetables were prepared by the control group. (See preceding note.)

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS <br> IN EXPERIMENTAL SECTION 

1. Experiences closely similar but more advanced groups given activities involving more preparation procedures, in some instances drawing on previous high school training : for example, making white sauce for corn pudding and scalloped potatoes.
2. Experiences requiring more time given to more advanced groups assuming that they would work more quickly.
3. With the control group, individual groups assigned the same activities as the advanced groups in experimental section had difficulty in completing work within the given time and needed special help with some of the procedures involved.

CEREAL AND STARCH COOKERY

Lecture and Discussion: Both Sections

Brief Outline
I. Importance in diet
A. Amount needed daily
B. Nutrients in cereals
C. Enrichment of refined cereals
II. Selection
A. Different types of grains
B. Different forms in which marketed--uncooked, partially cooked, ready to eat
C. Different forms due to milling--whole or cracked, granular, flaked
III. Preparation
A. Purpose
B. Prevention of lumping, separation of starch granules
C. Effects of acid, excess sugar, dextrinization on thickening power
D. Comparison of thickening power of various cereal products
IV. Characteristics of standard products

Major Points of Emphasis

1. Slight and reversible swelling of starch granules occurs in cold water.
2. Heating in water causes enormous swelling with increased viscosity; the granules become translucent and more soluble (Gelatinization).
3. For maximum swelling to take place, maximum surface of the granules must be maintained. Separation of starch granules may be achieved by mixing with cold liquid, creamed or melted fat, or sugar.
4. The amount of water different types of cereals absorb varies with the time required for cooking, fineness of division and the absorptive power of the starch.
5. The stiffness of a starch gel depends on:
A. The concentration of the starch
B. The kind of starch
C. The size of the starch molecule and factors that reduce the size of the starch molecule-hydrolysis with acid, dry heat, sugar concentration
6. The flavor of starch mixtures is improved with cooking for a short period beyond the point of maximum swelling.

## LABORATORY --CEREAL AND STARCH COOKERY

## Experimental Section

In each kitchen a
cereal or cereal product and a white sauce were prepared. These were used in separate dishes or combined in a single one.

1. Salmon Rice Croquettes
2. Tuna Noodle Casserole
3. Chicken Tetrazzini
4. Pittsburg Potatoes
(modified creamed potatoes)

Shrimp Creole
5. Vegetable Casserole

East Indian Rice

Control Section

All groups prepared a flake or granular or whole grain cereal or macaroni.

A medium white sauce was made in each group and combined with grated cheese or chopped hard cooked eggs. The cheese sauce was combined with macaroni or was served on toast. The creamed eggs were served on toast.

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION 

1. Variety of dishes prepared using cereal or cream sauce
2. Additional responsibilities in more complicated dishes-chopping vegetables, number of ingredients used

QUICK BREADS

Lecture and Discussion: Both Sections

## Brief Outline

I. Ingredients and their functions
A. Types of flour
B. Leavening agents--how they are incorporated or produced
C. Liquids
D. Fats
E. Eggs
F. Sugar
II. Classification--ratio of liquid to flour
A. Batters--pour and drop
B. Doughs--soft and stiff
III. Preparation
A. Methods of mixing
B. Gluten development

1. Manipulation
2. Effect of shortening and sugar
3. Influence on standard products
IV. Characteristics of standard product

Major Points of Emphasis

1. Gluten strands which give elasticity to a flour mixture are developed from the proteins of flour when combined with water.
2. The type and amount of protein differ with various flours; therefore, manipulation and proportion of ingredients will vary with the kind of flour used.
3. The kind, proportion and temperature of ingredients, the method of combining and manipulation influence gluten development.
4. Increasing the amount of water increases the strength of gluten to a certain point and then strength decreases with increasing water.
5. The expansion of air, steam and $\mathrm{CO}_{2}$ which have been incorporated and/or generated in the mixture causes flour mixtures to become porous.
6. The retention of the gas is dependent upon the elasticity and cohesiveness of the flour mixture.
7. Fat has a tenderizing effect upon gluten by being absorbed on the surface of the flour particles and preventing the development of a cohesive network.
8. Sugar also has a tenderizing effect upon gluten.
9. Eggs provide protein for structural framework and affect the general appearance, richness, grain, texture and flavor of baked products.

## LABORATORY I--QUICK BREADS

## Experimental Section

1. Plain Muffins--standard recipe

Rich Muffin Variation (increase in sugar and fat)
2. Orange Muffins Raisin Bran Muffins
3. Corn Muffins Date Muffins
4. Griddle Cakes

Blueberry Muffins
5. Waffles

Pecan Muffins

Control Section

In each kitchen Plain Muffins and the Rich Muffin Variation were made.

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS <br> IN EXPERIMENTAL SECTION 

1. Additional ingredients or techniques involved
2. Experience with variety of items from a basic procedure
3. Experience with waffle baker
4. Opportunity to see effect of bran and corn meal on gluten development

## LABORATORY II--QUICK BREADS

Experimental Section<br>Control Section<br>1. Biscuits--basic recipe<br>2. Cheese Biscuits<br>3. Shortcake<br>4. Biscuits-in-a-Ring<br>5. Quick Pizza<br>Demonstration on making biscuits by students<br>In each kitchen Plain<br>Biscuits and Buttermilk Biscuits were made.<br>Demonstration on making biscuits by teacher

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION 

1. Additional ingredients and techniques used
2. Experimented with various food items-main dish, tea accompaniment, dessert from basic biscuit dough

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## YEAST BREADS

Lecture and Discussion: Both Sections

## Brief Outline

I. Conditions necessary for production of $\mathrm{CO}_{2}$ by yeast
A. Food--glucose
B. Warmth--effect of low, optimum, and high temperatures
C. Moisture
D. Oxygen
II. Enzymatic action in production of $\mathrm{CO}_{2}$ by yeast
A. Diastase in flour hydrolizes starch to maltose
B. Maltase and sucrase hydrolize maltose and sucrose to simple sugars
C. Zymase in yeast breaks down simple sugars to $\mathrm{CO}_{2}$ and alcohol
III. Ingredients
A. Hard wheat flour for maximum amount of gluten
B. Liquid--milk must be scalded to destroy proteases which act on gluten
C. Sugar--food for yeast
D. Fat--small quantities so as not to interfere with gluten formation
E. Salt--too much retards growth of yeast
IV. Preparation
A. Methods of mixing

1. Straight dough
2. Sponge
B. Kneading
C. Shaping
D. Baking
V. Characteristics of standard product

Major Points of Emphasis

1. A lukewarm temperature is necessary for optimum activity of yeast. Cold retards its action and high temperatures destroy it.
2. Milk is scalded in making yeast bread to destroy the enzymes (proteases) which would hydrolize the gluten. (Also major points of emphasis listed under Quick Breads)

## LABORATORY I--YEAST BREADS

## Experimental Section

1. Standard Yeast Loaf--
all-purpose flour
2. Standard--cake flour
3. Standard--substituting

100\% whole wheat flour

## Control Section

Groups in this section made the same variables in the yeast loaves as were made in the experimental section.
4. Standard--substituting
$50 \%$ whole wheat flour
5. High Milk Protein Bread

The techniques were the same in all groups of both sections with only a slight difference in certain ingredients used. This type of laboratory experience was valuable to show the effect on gluten development and the subsequent volume from the different flours and dry milk solids.

## LABORATORY II--YEAST ROLLS AND VARIATIONS

## Experimental Section

Each group made yeast roll dough and shaped dinner rolls into:

1. cloverleaf rolls
2. fan tans
3. crescents
4. Parker House

In addition each group (other than Group One) also did the following:

Group 2. Cinnamon Twists
Group 3. Butterscotch Pecan Rolls

Group 4. Orange Pin Wheels

Group 5. Swedish Tea Ring

Same demonstrations given by teacher

## Control Section

Each group made yeast dough and shaped dinner rolls as in the experimental section.

## SHORTENED CAKES

## Lecture and Discussion: Both Groups

## Brief Outline

I. Classification of cakes
A. Sponge cakes
B. Shortened cakes--lean and rich
II. Factors affecting character of cakes
A. Ingredients--quality and proportion
B. Accurate measurement
C. Temperature for mixing and baking
III. Combining ingredients--thorough blending, especially of fat
A. Conventional method
B. Quick mix method
C. Muffin method
IV. Baking
A. Pans--preparation and size
B. Temperature
C. Tests for doneness
V. Standards of quality

Major Points of Emphasis

Major Points listed under Quick Breads were further emphasized and illustrated in this lesson.

## LABORATORY--SHORTENED CAKES

## Experimental Section

In each group a cake was made by the conventional method and one by the quick mix method.

1. Quick Method--Plain

Conventional--Spice
2. Quick Method--Plain

Conventional--Applesauce

Control Section

In each group a cake was made by the conventional method and one by the quick mix method. However, each was a plain cake in every group with some groups using a 2-egg formula and others a 4-egg formula for the conventional cake.
3. Quick Method--Devil's Food

Conventional--2-Egg Cake
4. Quick Method--White

Conventional--Gold
(using egg yolks)
5. Quick Method--Banana Nut

Conventional--4-Egg Cake

## ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION

1. Variety in cakes
2. Different ingredients used
3. More techniques required in more advanced groups:
A. Melting chocolate
B. Grating orange rind
C. Mashing banana
D. Chopping nuts
4. Use of soda with chocolate

## GELATIN

Lecture and Discussion: Both Sections

## Brief Outline

I. Source and nutritive value
II. Preparation
A. Hydration in cold liquid
B. Dispersion in hot liquid
C. Addition of fruits, vegetables and other similar ingredients when mixture thickens
D. Whip at same stage
III. Factors affecting gelation
A. Concentration
B. Amount of acid
C. Amount of sugar
D. Time allowed for setting
E. Temperature
F. Enzymatic action from bromelin in fresh pineapple
IV. Classification
A. Plain jellies
B. Fruit or vegetable jellies
C. Whips
D. Sponges--egg white added
E. Bavarian creams--whipped cream or milk or custard

Major Points of Emphasis

1. Heating collagen in the presence of moisture hydrolizes it to gelatin.
2. The degree of stiffness of a gelatin product increases as the concentration of gelatin increases.
3. As acidity is increased, firmness decreases.
4. A moderate amount of sugar increases stiffness, but a large amount retards gelation.
5. Standing overnight will produce a firmer gel than for just a few hours.
6. Low temperatures increase the formation of a gel. Those gels which set at a lower temperature melt more readily at a higher temperature than do those which set at a higher temperature.
7. Bromelin, a proteolytic enzyme in fresh pineapple, digests gelatin and prevents formation of gel structure.
8. In a gelatin foam, the increase of air dilutes flavor.

Experimental Section

1. Lemon Gelatin (from plain gelatin and commercial mix)
2. Whipped Gelatin
3. Sponge Gelatin (whipped egg white added)
4. Orange Bavarian (whipped cream added)
5. Spanish Cream

Demonstration: Hydration of gelatin before dispersion, whipping gelatin (students)

Control Section

Each group made lemon or orange gelatin, allowing one half to gel and whipping the other half when it had become thick but not gelled.

Same demonstration by teacher

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION 

1. Whipping egg whites )
2. Whipping cream ) learnings--principles
3. Custard
) for obtaining foam
4. Principles of protein cookery in custard

## SUGAR COOKERY (CRYSTALLIZATION)

Lecture and Discussion: Both Sections

## Brief Outline

I. Types of sugars and their characteristics
A. Sucrose-disaccharide--cane or beet sugar
B. Glucose and fructose--monosaccharides or simple sugars
C. Hydrolysis of sucrose to glucose
D. Varying degrees of sweetness
E. Moisture absorbing properties
II. Classes of candies
A. Creamy--crystalline structure
B. Amorphous--non crystalline--contain substances in large amounts which interfere with crystallization--corn syrup, acid, cream, gelatin
III. Preparation of crystalline type candies
A. Securing complete solution of sugar crystals
B. Cooking to desired concentration--use of thermometer
C. Cooling to proper degree of supersaturation
D. Agitation to produce recrystallization

## Major Points of Emphasis

1. The boiling point of a sugar solution increases as the concentration increases.
2. "Seeding" of sugar solutions by undissolved crystals in the solution or on sides of the pan causes formation of large crystals in the finished product.
3. Supersaturation of a solution is necessary before crystallization takes place.
4. Agitation of a supersaturated solution at higher temperatures produces larger crystals than at lower temperatures.
5. Acids in the presence of moist heat will hydrolyze sucrose.
6. Agitation produces smaller crystals than those formed spontaneously in an unstirred solution.

LABORATORY --SUGAR COOKERY

Experimental Section

1. Fudge
2. Divinity
3. Pralines
4. Peanut Brittle
5. Date Loaf

## Control Section

Each group made fudge or divinity.

## ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION

1. Processes similar
2. Pralines required fast work to drop before crystallization complete
3. Peanut brittle--working quickly as soda added and before cooling took place
4. Date loaf--dates interfere somewhat with crystalliza-tion--technique of rolling in damp towel and cutting

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## FROZEN DESSERTS

Lecture and Discussion: Both Sections

Brief Outline
I. Classification
A. Those stirred during freezing process--ice, frappe, sherbet, ice cream
B. Those frozen without stirring--mousses
II. Factors affecting character of product
A. Nature of ingredients

1. Finer texture when more solids used to delay and inhibit crystallization
2. As sugar content increases, freezing point lowered
B. Rate of crystal formation
3. Frozen slowly if stirred
4. Frozen rapidly if not stirred
III. The freezing process
A. Absorption of heat by melting ice
B. Temperature lowered by salt

Major Points of Emphasis

1. The addition of salt lowers the freezing point.
2. The addition of solids decreases the rate of crystallization and produces smaller crystals.
3. A larger proportion of solids is necessary when the product is not stirred while freezing.
4. Agitation results in the formation of smaller crystals than those produced in an unstirred solution.

## LABORATORY --FROZEN DESSERTS

Experimental Section

1. Lemon Ice
2. Pineapple Sherbert
3. Philadelphia Ice Cream
4. French Ice Cream
5. Chocolate Ice Cream

Control Section

The same frozen desserts were made by the group in the control section as were made in the experimental section. There was only slight difference in the procedure followed. It was important to show the differences in the various types of frozen desserts as the amount of solids incorporated differed.

## MILK AND EGG COOKERY

Lecture and Discussion: Both Sections

## Brief Outline

I. Importance of milk and eggs in diet
A. Amounts needed daily
B. Nutrients in milk, milk products and eggs
C. Safe and sanitary production
II. Processed milks
A. Pasteurized

B . Homogenized
C. Evaporated
D. Condensed
E. Dried
F. Cultured
G. Others
III. Reactions in milk due to:
A. Heating
B. Rennin
C. Lactic acid bacteria
IV. Reactions in eggs due to:
A. Aging and storage
B. Freezing
C. Heating-coagulation
V. Functions of eggs in cooking
A. Thickening
B. Leavening
C. Emulsifying
D. Binding
E. Coating
F. Clarifying
G. Color and flavor
VI. Preparation of milk and egg products
A. Hot chocolate or cocoa
B. Eggs--poached, scrambled, omelets, in shell (soft and hard cooked), and other methods
C. Custards--soft (or stirred) and baked

Major Points of Emphasis

1. Most proteins are coagulated by heat at a temperature below the boiling point of water.
2. Acid and/or rennin coagulate milk protein (casein).
3. Time, temperature and presence of other ingredients (sugar in custards, for example) affect coagulation.
4. Heating for long periods of time and at higher temperatures causes a toughening and shrinking of protein.
5. Protein forms a network to enclose liquid, as in custards, thus having a thickening effect.

## LABORATORY I--MILK AND EGG COOKERY

## Experimental Section

Demonstrations were given by students in preparing: poached egg scrambled egg steamed fried egg soufflé

Each group then prepared and served a simple breakfast using eggs cooked in a different way from those to which they were usually accustomed. Hot cocoa was also a part of the breakfast.

Control Section

The same methods of preparing eggs were demonstrated by the teacher. This section also prepared a breakfast including eggs and hot chocolate.

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION 

1. Student demonstrations
2. More experienced groups chose omelets and souffles that were more difficult to prepare, whereas in control section groups selected scrambled eggs, poached and fried eggs.

## LABORATORY II--MILK AND EGG COOKERY

## Experimental Section

1. Soft Custard

Baked Custard
2. Chiffon Custard (a meringue folded into cooled custard)

Lemon Upside-Down
Pudding
3. Floating Island Chocolate Bread Pudding
4. Cocoanut Custard Pie
5. Pumpkin Pie

## Control Section

custard and baked custard.
Each group prepared soft

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS <br> IN EXPERIMENTAL SECTION 

1. Variety of dishes from basic processes
2. Application as in pies
3. Additional techniques-meringue, melting chocolate
4. Larger number of ingredients to work with
5. Use of previous learnings in making pastry

FATS, OIL, AND PASTRY

Lecture and Discussion: Both Sections

## Brief Outline

I. Importance of fats and oils in diet
A. Caloric value--9 calories per gram
B. Saturated vs. unsaturated fats
C. Association with fat soluble vitamins-A, D, E, K.
II. Processing of fats
A. Rendering lard
B. Churning butter
C. Hydrogenation
D. Use of antioxidants to prevent rancidity
E. Use of emulsifiers to make a more plastic fat
III. Comparative shortening power of fats and oils
A. Lard and oil
B. Hydrogenated fats
C. Butter
IV. Function of fat in pastry--to separate particles of flour and prevent gluten development
V. Methods of preparation of pastry
A. Standard--cold water--tender, flaky product
B. Hot water--tender, crumbly product
C. Stir-and-roll, using liquid fat--tender product but not so flaky
VI. Factors affecting pastry
A. Amount and temperature of liquid--only enough to moisten--excess increases amount of gluten developed; cold liquid absorbed less readily
B. Manipulation--as little as possible--excess increases development of gluten
C. Size of fat particles--larger, more flaky; smaller, more tender
D. Flour--all-purpose preferable
(Starch, protein and gelatin cookery reviewed for cream and chiffon pie preparation)

Major Points of Emphasis
(In addition to principles already given relating to flour mixtures, starch, protein and gelatin cookery)

1. Fats very in shortening power due to their chemical composition and presence of other substances.
2. The chemical structure of fats determines the temperature at which they melt, solidify, or smoke.
3. The fat content varies in different fats.
4. Fat has a tenderizing effect in pastry by coating flour particles and preventing gluten development.

## LABORATORY I--PASTRY AND FRUIT PIES

## Experimental Section

1. Pastry--1/4 c. hydrogenated fat to l c. flour
2. Pastry--1/3 c. hydrogenated fat to 1 c . flour
3. Pastry--1/3 c. lard to
l c. flour
4. Hot water pastry--1/4 c. hydrogenated fat to 1 c . flour
5. Stir-and-Roll pastry--
l/4 c. oil to l c. flour

In each group a sample of
pastry was baked for purposes of comparison. Remaining pastry was used for individual
fruit pies using a prepared filling mix.

Demonstration: (by students) mixing, rolling, shaping pie crusts

Control Section

Each group prepared pastry by the standard method using $1 / 4 \mathrm{c}$. hydrogenated fat to 1 c . flour. A sample was baked for scoring and the remaining pastry used for individual fruit pies using a prepared filling mix.

Demonstration: (by teacher) same as for experimental

## LABORATORY II--CREAM AND CHIFFON PIES

## Experimental Section

All groups made pastry using
$1 / 3 \mathrm{c}$. hydrogenated fat to
1 c. flour. Individual pies
were made as follows:

1. Banana Cream Pie
2. Chocolate Cream Pie
3. Butterscotch Cream Pie
4. Lemon Meringue Pie
5. Lemon Chiffon Pie

Gontrol Section

All groups made pastry using $1 / 3 \mathrm{c}$. hydrogenated fat to 1 c . flour. Individual cream pies were made, the same as in the Experimental Section.

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## ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION

1. Manipulation more difficult with increased amount of fat
2. Different methods used with those having previous experience
3. Comparison in types of fat and effect on product 4. Comparison in methods

Actually little, if any, difference with cream pies. Chiffon pie involved some additional and different processes--gelatin, folding in egg whites.

## SPONGE CAKES

Lecture and Discussion: Both Sections

Brief Outline
I. Classes of sponge cakes
A. White or angel food
B. Yellow or true sponge
II. Differences between sponge and shortened cakes
A. Air and some steam responsible for leavening sponge cakes; soda or baking powder in shortened cakes
B. No fat in sponge cakes--tenderness dependent upon extent of whipping eggs, mixing procedure, correct proportions of ingredients and proper baking
III. Factors affecting foam structure of egg whites
A. Character and age of eggs
B. Temperature
C. Salt
D. Acid--cream of tartar or lemon juice
E. Fat--from egg yolk or otherwise
F. Type beater
G. Shape of bowl
IV. Combining ingredients
A. Beating egg whites until stiff but not dry
B. Folding motion used in combining flour and sugar, or egg yolk-sugar-flour mixture with beaten egg whites
V. Baking
A. Pan--ungreased and unlined
B. Temperature
C. Cooling before removing from pan
VI. Characteristics
A. Symmetrical in shape
B. Delicately browned
C. Tender crust, but not sticky
D. Texture tender, moist
E. Fine uniform grain

Major Points of Emphasis

1. Thin whites and older eggs give larger volume than thick whites.
2. Thick whites and fresher eggs give more stable foam.
3. Eggs at room temperature produce greater volume and finer grain than refrigerated eggs.
4. Salt causes a slight stiffening of the egg white protein but decreases stability of foam.
5. Acid (cream of tartar) aids in producing a more stable foam, prevents shrinkage and acts as a bleaching agent.
6. Fat from the yolk or other sources prevents foam formation.
7. Whipping egg whites until dry reduces elasticity desirable for leavening.

## LABORATORY--SPONGE CAKES

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Experimental Section
Control Section
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1. Sponge Cake
2. Angel Food
3. Syrup Sponge
4. Jelly Roll
5. Chiffon Cake (included here rather than with shortened cakes because of its similarity to sponge cakes in preparation and for comparison of texture and tenderness with sponge)

Demonstration by students: (at class period following this lesson)

Desserts from sponge cakes--
Baked Alaska, Filled Angel
Food Cake, Refrigerator
Dessert

Control Section

Three groups made sponge
and two groups made
angel food.

Same demonstration by teacher

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION 

1. Different processes
2. More procedures involved
A. Syrup for syrup sponge
B. Rolling jelly roll

MEATS, FISH, POULTRY
(Two lectures)

Lecture and Discussion: Both Sections

## Brief Outline

I. Importance in diet
A. Nutrients in meat, fish, poultry
B. Amount needed daily
II. Comparison of meat from various animals and different ages of a single animal as to:
A. Color
B. Tenderness
C. Flavor
D. Juiciness
E. Usual cuts from a specific animal
III. Factors affecting toughness or tenderness of cuts of meat as purchased
A. Position on the animal--cuts
B. Types and amount of connective tissue
C. Intermingling of fat-marbling
D. Ripening
E. Age and sex of animal
IV. Government grades
A. U.S. Prime--only $1 \%$ of all cattle
B. U.S. Choice
C. U.S. Good
D. U.S. Utility
V. Government inspection for interstate trade--signifies that meat produced and prepared for market under safe, sanitary conditions
VI. Preparation
A. Dry heat methods--for tender cuts
B. Moist heat methods--for tougher cuts-collagen changed to gelatin
C. Temperature--greater shrinkage as temperature increases--3000 F generally recommended as best
D. Thorough cooking of pork necessary to destroy pathogenic organisms
E. Tenderizing procedures

1. Pounding
2. Use of proteolytic enzyme preparation
3. Use of acid--only slightly effective, if at all
4. Use of phosphates--in bouillon
5. Pressure cooking
(How To Buy Meat, a filmstrip in 3 parts produced by Swift and Company, was used at one lecture period.)

## Major Points of Emphasis

1. Pounding or other mechanical means of dividing the protein structure aids in making meat more tender.
2. Acid has little, if any, effect in tenderizing.
3. Proteolytic enzymes aid in making meat more tender by partially hydrolyzing the protein structure.
4. Collagen is changed to gelatin upon the application of moist heat for an extended period of time.
5. As the temperature is increased, shrinkage is also increased in protein cookery.
6. Meat cooked in a pressure cooker will be more tender but less juicy than with the ordinary braising method.

## LABORATORY I--MEAT--MOIST HEAT COOKERY

## Experimental Section

1. Braised Steak--water
2. Braised Steak--tomatoes
3. Braised Steak--pounded
4. Braised Steak--pressure cooker
5. Braised Steak-tenderizer

Control Section

Braised steak with the same variables as those in the Experimental Section were prepared by the groups in this Section. There was no difference between activities for the two sections because of the particular objective of the lesson: to ascertain the effect of various treatment on the tenderness of meat.

LABORATORY II--MEAT AND POULTRY--DRY HEAT METHODS

## Experimental Group

1. Pan-Broiled Veal Round

Steak
Brown -and -Serve Rolls
2. Broiled Ham Slice with

Broiled Sweet Potatoes and
Broiled Pineapple
3. Breaded Pork Chops with

Sautéed Apple Rings
4. Fried Chicken

Rice and Cream Gravy
5. Broiled T-Bone Steak

Garnished with Vegetables

Demonstrations: by students

1. Roast and use of meat thermometer
2. Cutting a chicken

Control Group

The same meats were prepared but without the accompanying foods.

Demonstration: by teacher
Same as for other group

## LABORATORY III--SEAFOOD

| Experimental Section | Control Section |
| :--- | :--- |
| 1. Broiled Flounder | This section also prepared |
| 2. Fried Fish | the seafood dishes listed |
| 3. Tartar Sauce | for the experimental sec- |
| 4. Salmon Soufflé | tion. This lesson was |
| 5. Stuffed Shrimp | included to meet the needs |
|  | and interests of the |
|  | students in the specific |
| area where approximately |  |

# ADDITIONAL EXPERIENCES OF ADVANCED STUDENTS IN EXPERIMENTAL SECTION 

Experiences for all groups in both sections were closely similar.


[^0]:    $1_{\text {Esther }}$ Segner, et al., The Cooperative Test in Foods and Nutrition, Forms $\bar{X}$ and $\bar{Y}$ (Princeton, $\bar{N} \cdot{ }^{\text {J. }}$ : Educational Testing Service, 1948).
    ${ }^{2}$ Hildegarde Johnson, The Johnson Home Economics Interest Inventory (Ames: Iowa State College Press, 1955).
    ${ }^{3}$ Appendix A.
    4V. A. C. Henmon and M. J. Nelson, The Henmon-Nelson Tests of Mental Ability, Forms A and B (Boston: Houghton Mifflin Company, 1932 .

[^1]:    ${ }^{9}$ Minutes of the Southern Regional Conference on the Teaching of Foods and Nutrition at the College Level, October 28-30, 1957, Stillwater, Oklahoma.
    $10_{\text {Notes }}$ from Southern Regional Conference on the Teaching of Foods and Nutrition at the College Level, November 7, 1960, Dallas, Texas. Reported by Ona Smith, member of home economics faculty at Louisiana State University.
    ${ }^{11}$ Personal conference with Kathleen Cutlar, member of home economics faculty at Cornell University, Winter, 1960, East Lansing, Michigan.

[^2]:    12Paul R. Mort and William S. Vincent, Modern Educational Practice (New York: McGraw-Hill, 1950), pp. 401-404; Robert S. Fleming, "Principles of Learning," paper presented at Nutrition Education Conference, April 1-3, 1957, Washington, D.C.

[^3]:    ${ }^{8}$ Committee for Evaluating College Programs of Home Economics, op. cit., p. 157.
    ${ }^{9}$ Geraldine Clewell, "A Proposal for the Maintenance of Effective Instruction in Home Economics at the College Level" (unpublished Ph.D. dissertation, Ohio State University, Columbus, 1952), p. 1.

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    10 \text { Ibid., p. } 47
    $$

[^4]:    ${ }^{1}{ }^{1}$ W. Hugh Stickler, "Improving College Instruction," Improving College and University Teaching, Vol. II Corvallis, Oregon: Graduate School, Oregon State College), p. 33.

[^5]:    12Evelyn Wood Cummins, "Grouping: Homogeneous or Heterogeneous?" Educational Administration and Supervision, XIIV (January, 1958), 19.

    13Delmo Della-Dora, 'What Research Says About Grouping," Michigan Education Journal, XXXVII (April, 1960), 542.
    ${ }^{14}$ Claude E. Buxton, College Teaching, A Psychologist's View (New York: Harcourt, Brace and Company, 1956), p. 343.

    15Floyd C. Dockery, "Psychology for Beginners," Service Studies in Higher Education, Bureau of Educational Research Monographs, Number 15 (Columbus, Ohio: Ohio State University, 1932), pp. 148-149.

[^6]:    160. L. Davis, Jr., "Grouping for Instruction: Some Perspectives," Education Forum, XXIV (January, 1960), 214.
    ${ }^{17}$ Della-Dora, op. cit., p. 542 .
    18David A. Abramson, "The Effectiveness of Grouping for Students of High Ability," Education Research Bulletin, XXXVIII (October 14, 1959), 178-180.
[^7]:    30Clara M. Brown, "An Experiment in Sectioning," Journal of Higher Education, I (1930), 271.
    $31_{\text {Lathrop, op. cit., p. 776. - }}$
    $3^{32}$ Aleta Brown West, "The Influence of High School Homemaking on Achievement in the Beginning Clothing Course at the University of Colorado" (unpublished Master's thesis, The University of Colorado, Boulder, 1954), p. 32.

[^8]:    ${ }^{3} 3_{\text {W. A. Hunter, " }}$. Effect of the Study of Chemistry in High School upon Achievement in Beginning Chemistry in College" (unpublished Master's thesis, Iowa State College, Ames, 1948), p. 26.

    34Ronald R. Easter, "Does High School Physics Raise College Physics Grade?" Journal of Home Economics, XLVI (December, 1954), 729-30.

    35Wilson, op. cit., p. 43.
    36 West, op. cit., p. 32.

[^9]:    45Mildred Jean Davis, "Clothing Placement Tests for Entering Freshmen in the Division of Home Economics at West Virginia University, 1948-1951, Inclusive" (unpublished Master's thesis, West Virginia University, Morgantown, 1952), p. 42.

[^10]:    ${ }^{5}$ Appendix C.
    ${ }^{6}$ Appendix C .

[^11]:    ${ }^{7}$ Appendix B .

[^12]:    ${ }^{8}$ 'Report on the National College Home Economics Testing Program" (Princeton, N.J.: Educational Testing Service, 1950), p. 4.
    ${ }^{9}$ Virginia Simons, "An Evaluation of the Cooperative Test on Foods and Nutrition" (unpublished Master ${ }^{\text { }} \mathrm{s}$ thesis, Syracuse University, 1954), p. 36.
    ${ }^{10}$ Shefchik, op. cit., p. 47.
    $\mathrm{ll}_{\text {Herod, }}$ op. cit., p. 30.

[^13]:    12Hildegarde Johnson, "Technique for Determining the Professional Interests of Home Economists" (unpublished Ph.D. dissertation, Iowa State University, 1950), p. 25.
    $13_{\text {Appendix }}$ A.

[^14]:    14 Appendix A.
    15Appendix A.

[^15]:    $1_{\text {Stella Rachut, }}$ "Stability of Johnson Home Economics Interest Inventory Scores at Three Levels: Freshman, Senior, On-the-Job" (unpublished Master's thesis, Iowa State College, 1958), p. 25.

[^16]:    $8_{\text {Appendix }}$.

[^17]:    Rachut, Stella. "Stability of Johnson Home Economics Interest Inventory Scores at Three Levels: Freshman, Senior, and On-the-Job," Unpublished Master ${ }^{\text { }}$ s thesis, Iowa State College, Ames, 1958.

[^18]:    1. It is my responsibility as my share of family activities.
    2. I got credit in school for it.
    3. I got awards in 4 m for it.
    4. I have to do it because my mother works.
[^19]:    TOTAL
    AVERAGE

