

METHODS BEST ADAPTED TO THE TEACHING OF DOMESTIC

SCIENCE IN HIGH SCHOOLS.

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In this thesis the pupil has first been considered, as to age, psychological conditions and previous educational advantages. There has been arranged an outline of a general course of study including twenty eight lessons, to be used as a guide in teaching Domestic Science in high schools.

In presenting any subject for study or merely for an hour's entertainment the prime consideration must needs be the hearers. In teaching the pupil is essentially the teacher's hearer, so previous to planning the work the pupils to be taught were considered. The possibilities of younger students are to a great extent controlled by the age of the individual. The average age of high school pupils is from fifteen to seventeen years. The pupil has come up through the grades where he has acquired elementary and general knowledge and is just at the stage where he is able to grasp scientific knowledge. There is a new awakening and an enlargement of capacity to receive. The mind is keen and alert. Indeed it may be characterized as the impressionable age.

Successful teaching at this time presupposes a thorough

grasp of method on the part of the teacher, coupled with the ability of effective presentation. Observation should be encouraged and insisted upon whenever occasion permits as a foundation and an incentive to thought and reasoning.

The teacher must keep ever before her the fact that Domestic Science is truly a science, and that its genuine training value is equal in importance to its utility value. Theory, on the other hand, without practice is wholly incomprehensible to the young mind and is virtually of no value to the student, for this reason care should be taken to select experiments and practice dishes in keeping with each lesson.

Any graphic means of illustration is sure to be effective and should be employed whenever possible.

For reasons of broadness and clearer conception coordination of fundamentally related sciences with the teaching of Domestic Science is encouraged. It has been assumed in planning this outline of study that Hygiene, Advanced Physiology, General Chemistry and Physics have been given in either the freshman or sophomore year and that further study in Chemistry, also Economics and Botany be coordinated with the Domestic Science work, in the Junior and Senior years.

Lesson I.

1. Organization
2. Enrollment
3. Personal Equipment
4. Observation of desks and general laboratory equipment.
5. Dictation
 - a. Duties of the individual.
 - b. Houskeeper's duties.
 - c. Selection of houskeeper.
 - d. Assignment of lockers.

Lesson II.

Cleaning.

1. Cleanliness
 - a. Personal
 - b. Surroundings
 - c. Moral
2. Dust and its dangers.
3. Chemical as distinguished from bacteriological cleanliness.
4. Dictation
 - a. Review housekeeper's rules, and individual duties.
 - b. To sweep and dust
 - c. To wash dishes
 - d. To clean utensils

- d To clean utensils
 - a' Glass and silver wares
 - b' Tin, iron and steel wares
 - c' Copper, nickel and aluminium wares.
 - d' Wooden articles.
- e. To wash towels and cloths.

5. Practice Work

Wash dishes, clean and straighten laboratory.

Lesson III.

Combustion and Fuels.

1. Combustion

- a. Explain oxidation, take up air particularly its element oxygen.
- b. Give following as the working definition of combustion:

Combustion is the union of oxygen with other materials.

Bring out the carbon element of such materials explaining its relation to heat and light.

- c. Combustion as a universal process.
- d. Slow combustion, e.g., rusty iron, decayed wood.
- e. Quick combustion.
- f. Kindling point.
- g. Carbon cycle in nature - show constructive ability of plants.

h. Source of heat - liberation of sunlight.

2. Fuels

a. Kinds

a' Solid

coal

hard

soft

wood

hard

soft

coke

charcoal

b' Liquid

gasoline

kerosene

alcohol

c' Gas

natural

manufactured or coal

gasoline

d' Electricity

b. Fuel value

c. Sources - again bring out the constructive ability of plants.

d. Fires

a' Essentials for fire - fuel, kindling point, circulating air.

b' Experiment with lamp chimney and candle.

c' Explain the laboratory burner.

d' Explain that the process of burning is a chemical one and that it is identical with that which takes place in the body.

e. Dictation

a' Give directions for building fires, explaining the reasons for each successive step.

b' Give qualities of a good range.

c' Give abbreviations and measurements.

f. Practice work.

a' Water experiments

b' apple sauce.

Lesson IV.

Water.

1. Explanation of experiments of the previous day.

2. Characteristics of water.

a. Power as a solvent - explain use of term solvent.

b. Boiling point.

c. Steady temperature.

d. High temperature occasioned by addition of other substance.

e. Action of strong alkali on water, which forms a curd with soap.

f. Physical appearance

f. Physical appearance.

a' Condition in natural state.

b' Solidifying and melting points.

c' Evaporation.

3. Sources.

a. Rain water

b. Surface water

c. Ground water

4. Kinds

a. Hard

a' Permanent hardness.

b' Temporary hardness

Explanation of cause of each.

b. Soft water.

5. Sources and dangers of contamination

6. Purification of water

a. Filtering

a' Structure of filter

b' Care of filter

c' Value of filter

b. Boiling

c. Distilling

d. Sunlight

e. Aeration

7. Uses

a. Cleaning agent

b. In body

c. Solvent

- d. In cooking
 - e. Percentage of water in food
 - f. Percentage of water in body
8. Dietetic importance of water.
- a. Explain by graphic illustration, comparing body to engine, with heart as pump, controlled by brain. In explaining that it is a carrier of tissue food, compare blood stream to a system of traffic. Bring out its important property as a solvent.
 - b. Amount that should be taken daily.
 - c. Percent obtained from different foods
 - d. Time for drinking water and why.
 - e. Result if too little water is taken.
9. Bring out the cellular structure of all bodily tissue, illustrate by means of an orange.
10. Practice.
- a. Addition of sugar to boiling water - hydrolysis.
 - b. Solubility
 - c. Melting point
 - d. Caramelization
 - e. Soft ball stage, etc.
 - f. Diffusibility
 - g. Dried apricots
 - h. Addition of salt to water.

Lesson V.

Sugar.

1. Review
2. Explanation of previous experiments which include the following characteristics.
 - a. Physical appearance.
 - a' Solubility
 - b' Temperature of melting point
 - c' soft ball
 - d' Caramelization
 - e' Burning
 - f' Importance of diffusibility and solubility in the process of digestion.
 - b. Sources, with examples
 - a' Sugar cane
 - b' Sorghum plant
 - c' Sugar maple
 - d' Milk
 - e' Fruits
 - c. Kinds
 - a' Cane sugar
 - b' Grape sugar - dextrose
 - c' Milk sugar
 - d. Glucose syrup
 - e. Kind of food.

- f. Dietetic value
- g. Amount allowable in a day
- h. Results of excessive use
 - a' Local injury
 - b' General injury
- i. Digestion
- j. Cookery
 - a' Change brought about by boiling with dilute acids.

3. Practice

- a. Starch experiments
 - a' Chew cracker
 - b' Treatment with cold water
 - c' Treatment with hot water
 - d' Washing grated potato
 - e' Washing flour
 - f' Washing turnip.
- b. Fondant
- c. Peanut brittle
- d. Puffed rice brittle

Lesson VI.

Starch.

1. Discussion of previous day's practice work.
2. Characteristics of starch - Physical
 - a. Texture
 - b. Color
 - c. Solubility
 - d. Action with hot and cold water
 - e. Explanation of starch grain.
 - f. Microscopic examination of starch
3. Dictation.
 - a. Rules for setting table.
 - b. Formulae for white sauces with explanation of their uses and principle involved in making.
4. Practice work
 - a. White sauce No.1
 - b. Creamed onions, turnips or other obtainable vegetable.

Lesson VII.

Starch (continued)

1. Rapid review.
2. Chemical characteristics of starch.
 - a. Dry heat
 - b. Action with vinegar and other dilute acids.
 - c. Explanation of term chemical change.

- d. Change brought about by boiling.
- 3. Digestion.
 - a. Result and benefit of prolonged mastication.
 - b. Explanation of changes in starch in nature -
and these compounds with human digestion.
- 4. Slight discussion of manufacture and kinds of starch,
laundry, etc.
- 5. Practice work
 - a. Scalloped potatoes
 - b. Boiled rice with sugar and cream.

Lesson VIII.

Starch (continued)

- 1. Review
- 2. Vegetables
 - a. Classes
 - b. Composition
 - c. Value as a food
 - d. Cheap food
 - e. Preparation and cookery of vegetables
- 3. Cookery of starchy foods - length of time and why.
- 4. Practice
 - a. Celery cream soup
 - b. Buttered beets.
 - c. Crisp crackers

Lesson IX.

Starch (continued)

1. Slight review.
2. Class of food
 - a. Name of class
 - b. Comparison of human body as regards the fuel used and the heat and energy generated.
 - c. Amount of this food required.
 - d. Reasons for its universal use.
3. Summary of all the points on the four lessons on starch.
4. Definition of carbohydrate
5. Practice
 - a. Chocolate cornstarch mold
 - b. Macaroni with tomato sauce
 - c. Lesson in serving.

Lesson X.

1. Review of starch
2. Characteristics of cellulose.
 - a. Examples
 - b. Appearance
 - c. Structure - use some coarse vegetable as celery to show this.
 - d. Solubility
 - e. Treatment with vinegar or other dilute acids.
3. Digestion
 - a. Bacterial action

4. Use as food
 - a. Result of too much in diet
 - b. Result of too little in diet.
5. Source
 - a. Principal foods containing it.
6. Cereals
 - a. Kinds.
 - b. Composition
 - c. Qualities
 - d. Cookery
 - e. Serving
7. Practice work
 - a. Cracked wheat
 - b. Oat meal
 - c. Rice
 - d. Corn
 - e. Melting points of
 - a' Lard
 - b' Mutton Tallow
 - c' Suet.
8. Solubility of fats
9. Foods - definition
10. Summary of carbohydrates.

Lesson XI.

Written Review.

Lesson XII.

Fats and Oils.

1. Kinds
 - a. Animal
 - a' Lard
 - b' Beef tallow
 - c' Mutton tallow
 - d' Butter
 - b. Vegetables
 - a' Olive
 - b' Cotton seed.
 - c' Linseed
 - d' Cocoanut
2. Discussion of melting points of fats previously melted, and their solubility.
3. Special fats
 - a. Oleomargarine
 - b. Chicken fat
 - a' Use of each
4. Uses of fats in body - As questions before discussing this topic in full.
5. Digestibility depends
 - a. on kind of fat
 - b. individual
 - c. amount taken
 - d. form taken
6. Soap and soap making
7. Causes of rancidity

8. Substitution
9. Fat as reserve food
10. Practice work
 - a. Potato balls
 - b. Rice Croquettes
 - c. Solubility of different parts of egg.
 - d. Coagulation of egg parts.
 - e. Soap making demonstrated.

Lesson XIII.

Protein.

1. Review fats and oils.
2. Proteid necessary to all life, vital part of each cell.
 - a. Tissue building food
3. Characteristics
 - a. Cellular structure - illustrate my means of an orange and reference to starch cell.
 - b. Contents of cell and its condition.
 - c. Solubility - importance of this characteristic.
4. Explanation of previous experiments.
5. Cookery
 - a. Cookery of any food.
 - b. Reasons for cooking
 - c. Reasons for not cooking
 - d. Temperature for cooking proteid.
6. Time for using
 - a. Constant need of proteid for building purposes.

b. Amount dependent somewhat upon occupation.

7. Condition fit for use.

a. Result of proteid food which has stood.

8. Digestion

a. Importance of soluble food.

b. Place of proteid digestion

c. Best form in which to take proteid.

9. Practice

a. Examination of cross section of epithelium,
heart muscle or intestine to show the
cells.

b. Explanation of function of cells by explanation
of work of one celled animals.

c. Sauté potatoes.

d. Soft cooked eggs

e. Poached eggs

10. Eggs

a. Structure

b. Discussion of previous experiments

c. Test for fresh eggs

d. Composition

e. Cookery

f. Dietetic value - explain how chick lives on
contents.

11. Practice continued.

a. Set milk to sour.

b. Inoculate butter to become rancid

c. Heat milk

d. Add acid.

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Lesson XIV.

Milk and Its Products.

1. Slight review.
2. Explanation of experiments on milk bringing out these characteristics.
 - a. Action of acid and souring
 - b. Heat
 - c. Counteraction of soda due to alkali.
 - d. Bacterial action
3. Comparison of condition and properties of sour milk with those of milk after acid is added.
4. Kinds used
 - a. Goats
 - b. Cows
 - c. Human
5. Composition
6. Digestibility
7. Food value.
8. Show actual constituents.
 - a. Fat by skimming
 - b. Proteid by precipitating
 - c. Sugar in whey
 - d. Salts in whey
 - e. Water in whey
9. Contamination
 - a. Sources
 - a' Utensils
 - b' Water used for cleansing

c' Cow

d' Milker

e' Air

b. Kinds

a' Disease germs - typhoid especially

b' Lactic acid

c' Change in composition or flavor

c. Prevention

a' Absolute cleanliness

b' Scalding water.

10. Milk products

a. Whey

a' Definition

b' Food value

b. Cream

a' Food value

b' Digestion

c. Cheese

a' Physical appearance

b' Making

c' Cheap source of protein food.

d' How best given

e' Source

f' Digestibility

g' Composition

11.

- d. Butter
 - a' Characteristics of good butter
 - b' Making of.
- e. Buttermilk
 - a' Source
 - b' Food value
 - c' Digestibility
 - d' Composition
- 11. Enzyme digesting milk - rennin
 - a. Where found
 - b. Its action
 - c. Product formed.
- 12. Practice work.
 - a. Junket pudding.
 - b. Caramel custard.
 - c. Cottage cheese
 - d. Test for points of coagulation of proteids of beef.
 - e. Digestion with pepsin or pancreatin.
 - f. Put beans to soak.

Lesson XV.

Proteid (Continued)

- 1. Review
- 2. Discussion of previous experiments.
- 3. Source of proteid
 - a. animal
 - b. Vegetable
- 4. Animal
 - a. Milk

b. Eggs

c. Meats

a' Kinds suggested first by pupils.

b' Classification

c' Rigor Mortis - cause and effect.

d' Age of meat.

e' Putrefactive changes

a" bacteria

f' Parasites

g' Meat as a disease carrier

h' Digestibility of short and long fibred
meats.

i' Composition

a" Amount of water, proteid and fat.

j' Cookery

k' Beef and Pork - comparison of

a" Composition and structure

l' Economic value of meat

m' Tests for good meat

5. Vegetable proteid

a. Sources

b. Amounts

c. Digestibility

d. Effect of cellulose and starch on its digestion.

e. Reason for using vinegar on beans.

f. Cookery

g. Economic value

6. Digestive enzymes that act upon proteid food.

7. Place in dietary
8. Collagen noticed when cooking meat.
9. Practice work.
 - a. Addition of cold water to gelatine
 - b. Addition of boiling water to gelatine
 - c. Broiled beef steak
 - d. Boiled meat.
 - e. Boiled fish with Hollandaise sauce.
 - f. Baked beans.

Lesson XVI.

1. Review extensively meats.
2. Explanation of previous experiments to show following characteristics
 - a. Solubility
 - b. Power of coagulability
 - c. Loss of this power
3. Source
4. Cookery - temperature
5. Class of food and food value
6. Practice
 - a. Lemon jelly
 - b. Stock soup from boiled meat of previous lesson.

Lesson XVII.

Test on Proteid and Gelatine.

Lesson XVIII.

Digestion.

1. Ask questions as to
 - a. Why we eat
 - b. What happens to the food eaten.
2. Digestive organs
 - a. Extent
 - b. Use
 - c. Form
 - d. Structure
3. Digestion experiments
 - a. Difference in taste of cracker acted upon by saliva.
 - b. Action of malt diastase on starch
 - c. Action of pepsin on meat
 - d. Action of rennin on milk
 - e. Action of pancreatin on meat and bread.
4. Solution, mechanical or chemical a first essential in digestion.
5. Explanation of digestive juices and their actions.
 - a. Saliva
 - b. Gastric juice
 - c. Pancreatic juice.
6. Filter the products of artificial digestion.
7. Absorption

7. Absorption
 - a. Condition of digested food
 - b. Use of absorbed food and its storage.
 - c. Use of undigested residue.
8. Digestion as related to disease.
 - a. Reasons for digestive difficulties.
 - b. Prevention of such difficulties
 - c. Cure - importance of dietary study.
9. Care of digestive organs
10. Use of water in the dietary
11. Practice work
 - a. Set yeast to grow
 - b. Popovers - use of eggs as leavening agent.

Lesson XIX.

Yeast and Flour.

1. Review digestion
2. Examine yeasts
3. Nature of yeast
 - a. Simple vegetable
4. Structure
5. Reproduction
6. Conditions necessary for growth
7. Manufacture
8. Use - leavening agent

9. Flour

- a. Manufacture - brief.
- b. Characteristic
- c. Composition
- d. Physical appearance
- e. Pass samples
- f. Kind of food
- g. Action of yeast on flour
 - a' Intermediate products
 - b' Final products
 - c' Use of these products
- h. Necessity of gluten in flour when yeast is used.

10. Practice work

- a. Making of yeast
- b. Marguerites.

Lesson XX.

Bread.

- 1. Start bread with plenty of yeast
- 2. Review yeast and flour
- 3. Bread
 - a. Principles involved in making
 - b. Methods of making
 - c. Temperature and regulation of oven
 - d. Causes of poor bread.
 - a' Sourness
 - b' Heaviness
 - c' Overlightness
 - d' Unsteril

- e' Courseness of texture
 - e. Difference in grades of flour.
 - a' Sprouted wheat
 - b' Hard wheat
 - winter
 - spring
 - c' Soft wheat
 - winter
 - spring
 - d' Musty wheat
 - f. Variations in minor ingredients
4. Practice
- a. Baking powder in water
 - b. Soda and an acid
 - c. Bread

Lesson XXI.

Leavening Agents Other Than Yeast.

1. Review
2. Explanation of previous experiments
3. Baking powder
 - a. Characteristics
 - a' Gas production - its value
 - b' Rapidity of action
 - c' Chemical change
 - d' Appearance
 - e' Manufacture
4. Soda and cream of tartar.
 - a. Taste

- b. Use of each - how used.
- c. Relative cost of these.

5. Practice

- a. Baking powder biscuit
- b. Sour milk muffins

Lesson XXII.

Batters and Doughs.

1. Review

2. Batters

a. Kinds

a' Pour

b' Drop

b. Definition of batter, and each kind.

3. Doughs

a. Kinds

a' Soft

b' Stiff

b. Definitions

4. Cake making

a. General principles involved

a' Eggs

b' Baking powder

c' Yeast

d' Soda

b. General formulae and variation

c. Flavorings

a' Use

b' Kinds

- e' Amount and restrictions
- d' Effect on digestion
- e' Quality used

5. Practice work

- a. White cake
- b. Oatmeal wafers
- c. Serving

Lesson XXIII.

Cake Filling and Pie
Making.

1. Review

2. Pies

a. Parts

a' Filling

b' Crusts

a" General principles in making

a"' Rapidity of making

b"' Cold ingredients

c"' Qualities of good crusts

d"' Top crust

c' General talk on fillings

d' Digestibility.

3. Cake Filling - general talk

4. Practice

- a. Fruit and custard pies
- b. Boiled icing

Lesson XXIV.

1. Test on yeast, etc.
2. Beverages
 - a. Kinds
 - a' Hot and Cold
 - b' Other divisions
 - b. Uses
 - c. When used, how used.
3. Practice
 - a. Lemonade
 - b. Fruit punch
 - c. Tea
 - d. Coffee

Lesson XXV.

Fruit and Salad.

1. Review test questions.
2. Fruits
 - a. Kinds
 - b. Characteristics
 - c. Composition
 - d. Flavor and acid
3. Use
4. Time of using
 - a. Ripe and unripe
5. Qualities of good fruit
6. Digestibility
7. Pickled

7. Dietetic Use
8. Cookery
9. Salads
 - a. General explanation of a salad
 - b. Kinds
 - a' Fruit
 - b' Vegetable
 - c' Meat
 - d' Nut
 - e' Mixed
 - f' Egg.
 - c. Dressings
 - d. Qualities of salad ingredients, mixing of these.
 - e. Place in dietary
 - f. Serving.
10. Practice
 - a. Fruit salad
 - b. Meat salad
 - c. Nut salad.

Lesson XXVI.

Frozen Mixtures.

1. Kinds
 - a. Ices
 - b. Sherbets
 - c. Ice cream
 - d. Frozen custards and puddings

2. Freezing
 - a. Principles
 - b. Freezers and substitutes
 - c. Ice, salt and proportions
 - d. Mixture to be frozen
 - e. Packing and moulding
3. Dietetic value
4. Serving
5. Practice work
 - a. Orange ice
 - b. Frozen custard

Lesson XXVII.

Summary.

1. Cleanliness, neatness
 - a. Personal
 - b. In kitchen, work, utensils, etc.
2. Fires
 - a. Principles of combustion
 - a' Low kindling point
 - b' Circulating air
3. Water
 - a. Use as a cleaner
 - b. Use as a bodily cleanser
 - c. Amount used by body
 - d. Purity
 - e. In foods and drinks
4. Starch

4. Starch

- a. Sources
- b. Structure
- c. Time of cooking
- d. Result of cooking, boiling, baking.
- e. Use in body
 - a' Heat and energy
 - b' Proteid sparer

5. Sugar

- a. Sources
- b. Use in body
 - a' Heat and work
 - b' Proteid sparer

6. Cellulose

- a. Sources
- b. General characteristics
 - a' Examples
 - b' Experiments
- c. Use in dietary
 - a' Bulk
 - b' Peristaltic action

7. Food defined

8. Fats and oils.

- a. Sources
 - a' Vegetables
 - b' Animal
- b. Physical characteristics
 - a' Melting point, etc.

c. Uses in cooking

a' Frying

b' Shortening

d. Use in body

9. Proteids

a. Sources, form, etc.

a' Animal

b' Vegetable

b. Cookery

c. Use in Body

a' Tissue builder

b' Energy giver

d. Necessity of proteid food to life

10. Gelatinoids

a. Examples and character

a' Meat

b' Gelatin

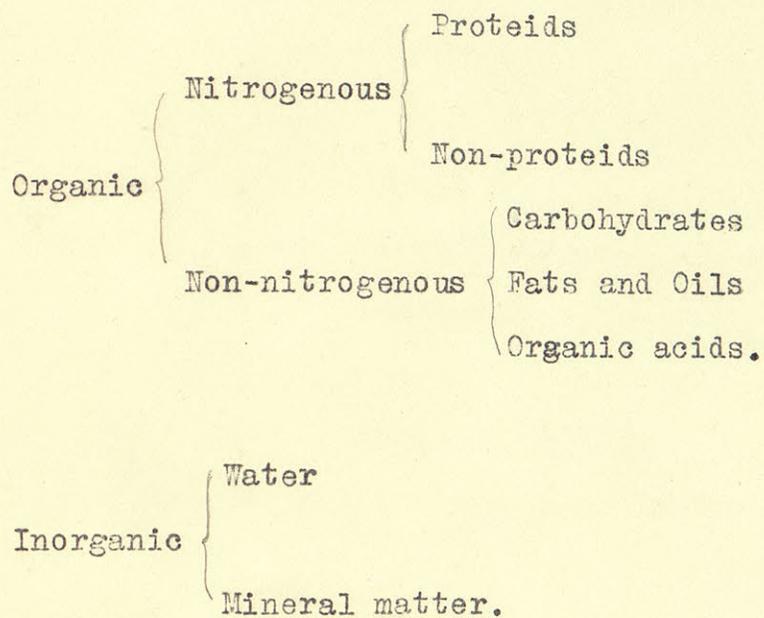
b. Use in body

c. Cookery

d. Amount used

11. Classification

11 Classification



12. Definition of digestion

- a. Digestive organs
- b. Digestive juices
- c. Food digested in different parts of alimentary canal.
- d. Object of digestion
 - a' In disease
 - b' To keep healthy

13. Bread and baking powder mixtures

- a. Yeast
 - a' Nature
 - b' Condition for growth
- b. Bread
 - a' Principle in making

- c. Baking powder mixtures.
 - a' Principle of action
- 14. Cakes, pies, ices, beverages.
- 15. Food preservation.
 - a. Principle involved
- 16. General summary
 - a. Balance of proteids, fats and carbohydrates in dietary.

Lesson XXVIII.

Examination and cleaning of Laboratory.