National Curriculum for
FOOD AND NUTRITION
(Elective)
Grades IX-X
2007

GOVERNMENT OF PAKISTAN
MINISTRY OF EDUCATION
ISLAMABAD

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CONTENTS

INTRODUCTION

Food and Nutrition is a science important for the health and well being of the family. It is a vast field and study of this subject is extremely important for all individuals. Food and Nutrition is a science-based subject, which gives the understanding of proper nutrition and healthy eating practices. It deals with topics that are vital for the survival of human beings. The study of Food and Nutrition is a strong connecting link between the students and the health of their families. The ability to develop a healthy personality depends primarily on knowledge that helps not only to keep the person mentally alert but also physically fit. Pakistan is a developing country and malnutrition is widespread in all sections of the community, with numerous factors contributing to this situation. It is the responsibility of all persons to acquire the knowledge of Food and Nutrition necessary to achieve the acceptable dietary standards for the maintenance of healthy living, for themselves and their families.

Every culture has its own understandings of the role of different foods as to which foods are good for health; suitable for children; or should be avoided under different physiological conditions; and how foods should be prepared and served. There are a number of beliefs and practices that are positive and support good nutrition. Similarly, there are a number of other practices and taboos that have a negative impact on the nutritional well being of individuals. Young people need sound scientific information in order to make healthy food choices not only for themselves but also for their families. They need to be educated and trained to become healthy consumers.

Proper nutrition means that all the essential nutrients: carbohydrates, fats, proteins, vitamins, minerals and water are supplied and utilized in adequate balance to maintain optimal health and well-being. Good nutrition is essential for growth and development, maintenance and repair of body tissues, optimum activity level and working efficiency, resistance to infection and diseases.

This curriculum presents the core information of an introductory nutrition course. It will help the students to explore why we eat food with a brief overview of the nutrients, the science of nutrition and the important relationship between diet and health. Students in grade IX and X are at the stage of their life where they must grasp the significance of a balanced diet for healthy living. It is hoped that this curriculum will assist the students to become successful in fulfilling important personal nutritional needs, shop wisely, manage time, plan nourishing meals for all

ages, and prepare and serve meals attractively. The basic information is weaved into practical application; showing how nutrition influences people's lives.

Rationale for Curriculum Enhancement

The Curriculum Development team for Food and Nutrition for grades IX-X was framed involving subject experts and teachers of Food and Nutrition from colleges all over Pakistan. Following strategies were adopted in designing /revising the curriculum:

- need assessment by critically reviewing current curriculum
- consultative meetings with the working teachers and professors to get feedback and comments on existing curriculum
- identification of eminent areas of study
- identification of standards for communicating the impending areas
- study of foreign curricula for comparison and guidelines
- drafting of contents
- preparation of detailed contents in the light of competencies to be developed
- preparation of specific learning outcomes according to the contents
- preparation of study and evaluation scheme for implementing the curriculum

The requirement to revise and update Food and Nutrition curriculum is based on the aspirations of the Government and the society envisages vibrant and responsive curriculum.

The prime focus of this curriculum is based on the broad areas of Food and Nutrition. This document is based on three broad categories of activities that connect Food and Nutrition with health and wellbeing of people:

- knowing how to use knowledge scientifically
- developing an understanding of home making tasks relating to foods, based on scientific knowledge
- utilization of all the resources of modern science to improve the nutrition of the family

This curriculum will broaden the horizon and vision of the students by teaching them latest techniques and developing scientific and practical approach. It will prepare the students for the world of work, as well as for pursuit of professional and specialized education. Here's looking to healthier Pakistan.

AIMS AND OBJECTIVES

AIMS

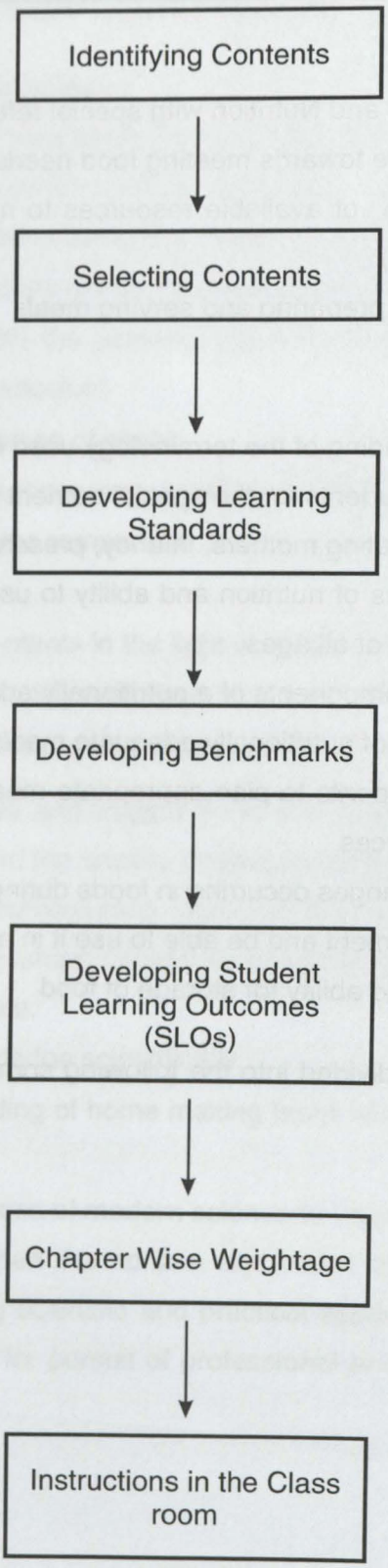
- develop knowledge of Food and Nutrition with special reference to healthy living
- develop professional attitude towards meeting food needs of the family
- build capacity for utilization of available resources to meet human needs (production, consumption, and services)
- to develop skill in planning, preparing and serving meals

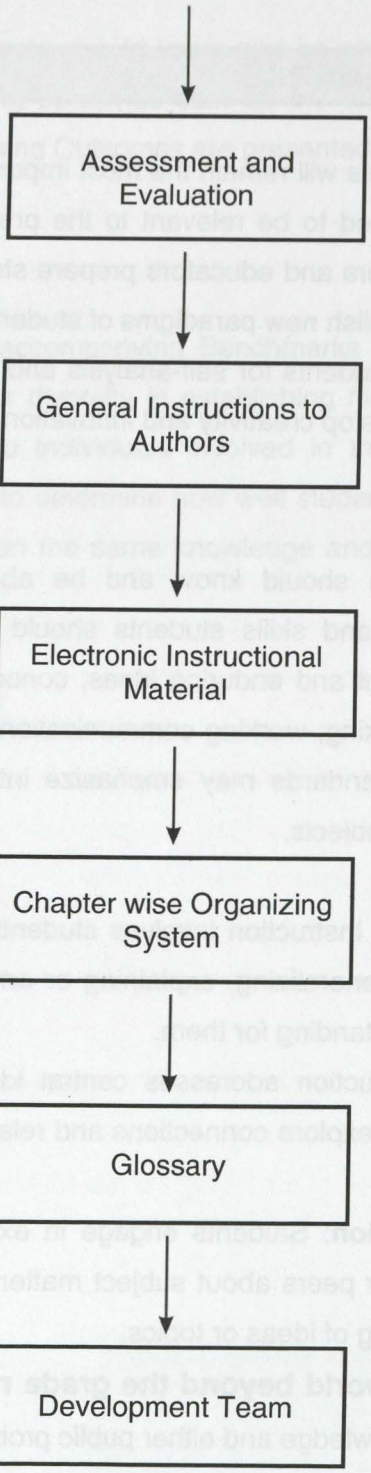
OBJECTIVES

- to inculcate clear understanding of the terminology used in food science
- to give the knowledge to students for the special nutrient needs of people through the life cycle --- expectant and lactating mothers, infancy, preschool, teenagers and old age
- understanding the principles of nutrition and ability to use this knowledge in the feeding of normal and sick persons of all ages
- to describe the essential components of a nutritionally adequate diet
- to be able to plan a variety of nutritionally adequate meals
- to build capacity of the students to plan appropriate meals in accordance with the body needs and available resources
- monitor and control the changes occurring in foods during preparation and cooking
- to select appropriate equipment and be able to use it in a safe and appropriate manner
- to create understanding and ability for storage of food

This document has been divided into the following components in order to achieve the desired aims and objectives

Curriculum Development Process




Assessment and Evaluation
General Instructions to Authors
Electronic Instructional Material
Chapter wise Organizing System
Glossary
Development Team

STANDARDS AND BENCHMARKS

In the 21st century, students will remain the most important human resource. In the new millennium curricula, changes need to be relevant to the present day technological era. It is critical that academic policy makers and educators prepare students to meet the challenges of changing global society and establish new paradigms of student learning of student learning.

This includes preparing students for self-analysis and for future roles of team workers. Equally important is that they develop creativity and innovation in building knowledge.

STANDARDS

They are what students should know and be able to do. Standards are broad descriptions of the knowledge and skills students should acquire in a subject area. The knowledge includes the important and enduring ideas, concepts, issues and information. The skills in include the ways of thinking; working communication, reasoning and investigating that characterize a subject area. Standards may emphasize interdisciplinary themes as well as concepts in the core academic subjects.

Standards are based on:

- **Higher Order Thinking**: Instruction involves students in manipulating information and ideas by synthesizing, generalizing, explaining or arriving at conclusions that produce new meaning and understanding for them.
- **Deep Knowledge**: Instruction addresses central ideas of a topic or discipline with enough thoroughness to explore connections and relationships and to produce relatively complex understanding.
- **Substantive Conversation**: Students engage in extended conversational exchanges with the teacher and / or peers about subject matter in a way that builds an improved and shared understanding of ideas or topics.
- **Connections to the world beyond the grade room**: Students make connections between substantive knowledge and either public problems or personal experiences.

BENCHMARKS

They indicate what students should know and be able to do at various developmental levels. Our benchmarks are only for Food and Nutrition taught for grade IX-X

LEARNING OUTCOMES

They indicate what students should know and be able to do for topic in the subject of Food and Nutrition. The learning outcomes sum up the total expectations from the student. Within this documents, the Learning Outcomes are presented fewer than three subheadings:

- understanding
- skills development
- science and technology

The standards and the accompanying Benchmarks will assist in the development of comprehensive curriculum, foster diversity in establishing high quality learning outcomes and provide an accountability tool to individuals involved in the education marketplace. These provide a common denominator to determine how well students are performing and will assure that all students are measured on the same knowledge and skills using the same method of assessments.

STANDARDS

1. Using Scientific Knowledge

Students well versed in the study of Food and Nutrition are better able to understand and appreciate the health and well being of the individual and families and are also better able to make calculated decisions and take informed actions. Activities that require scientific thought include knowledge and understanding of food science in the real world.

Standard 1.1

Demonstrate nutrition and wellness practices that enhance individual and family well being.

2. Reflecting on Scientific Knowledge

Students well-versed in the study of food science are able to "step back" and analyze or reflect on their own knowledge. One such type of analysis is the justification of personal knowledge or beliefs using either theoretical or empirical arguments. These students can also show an appreciation of scientific knowledge and to appreciate in daily living. They are also able to take a cultural perspective on concepts and theories to discuss institutional relationship among science, technology, and society. Finally, these students can describe the limitations of their own knowledge in relation to scientific knowledge in general.

Standard 2.1

Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans

3. Unifying Knowledge from Deferring Content Areas

Students well versed in the study of Foods and Nutrition are able to understand and unify knowledge from various areas of study for the development of the individual and the well being of the family.

Standard 3.1

Integrate knowledge, skills, and practices required for

- Food distribution
- Food services
- Food sciences
- Nutrition
- Dietetics

4. Constructing New Scientific Knowledge

Students well versed in the study of the Food and Nutrition possess the ability to ask questions about food science. They can develop solutions to problems that they encounter and find answers to questions by using scientific knowledge and techniques. In the process of finding solutions, students may use their own knowledge and reasoning abilities, seek out additional knowledge from other sources, and engage in empirical investigations of the real world.

Standard 4.1

Students will display a sense of curiosity and take interest in the natural world and demonstrate an increasing awareness that this has lead to new developments in food sciences and technology they will learn from books and other sources of information and reconstruct previously learned knowledge.

BENCHMARKS

Standard 1.1 Demonstrate nutrition and wellness practices that enhance individual and family well being.

Benchmarks

1. Analyze factors that influence dietary and wellness practices across the life span.
2. Evaluate the nutritional needs of individuals in relation to health and wellness.
3. Evaluate the impact of science and technology on food composition.
4. Demonstrate ability to acquire, handle and use food to meet nutrition and wellness needs.
5. Evaluate factors that affect food safety.

Standard 2.1 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.

Benchmarks

1. Study the scientific principles of food preparation and develop high standards in the selection, preparation and service of food.
2. Understand the principles of food preparation and ability to apply them in preparing food of superior quality.
3. Analyze the principles of nutrition and ability to apply them in interpreting the nutritional needs of people.
4. Demonstrate the activities of the home maker and ability to interpret them in relation to food selection, storage, preparation and meal service at various levels of income.

Standard 3.1 Integrate knowledge, skills, and practices required for

- Food distribution
- Food services
- Food sciences
- Nutrition
- Dietetics

Benchmarks

1. Study the natural sciences and their application to nutrition.
2. Understand and sees the importance of scientific principles and nutrition throughout life.
3. Apply knowledge, skills and practices for safe food preparation.
4. Demonstrate the use of current technology as it relates to food.
5. Determine daily dietary needs of family at various stages based upon recommended dietary guidelines

Standard 4.1 Students will display a sense of curiosity and take interest in the natural world and demonstrate an increasing awareness that this has lead to new developments in food sciences and technology they will learn from books and other sources of information and reconstruct previously learned knowledge.

Benchmarks

1. Generate scientific questions about Food and Nutrition based on observations.
2. Develop solutions to problems through reasoning, observation, and investigations.
3. Design and conduct scientific investigations.

TABLE OF CONTENTS

GRADE IX-X LEARNING OUTCOMES

Chapter 1 Introduction to the Study of Food and Nutrition

Contents	Learning Outcomes
	Students should be able to:
1.1.Definition of food, nutrition and relevant terms	▪ Define food ▪ Define nutrition ▪ Define malnutrition, ▪ Define calorie ▪ State and define RDA (recommended daily allowance) etc
1.2.Role of nutrition in health	▪ Define nutrients ▪ Explain role of nutrition in: • physical health • mental health • preventing diseases
1.3. Functions of foods	▪ List the basic functions of food. ▪ Explain the role of food as a source of energy ▪ Describe the role of food in tissue building and maintenance ▪ Discuss the role of food in preventing deceases
1.4. Signs of good and poor nutrition	▪ Identify the signs of poor and good nutrition ▪ Describe the effects of nutrition on growth in children ▪ List the effects of nutrition on skin, hair, nails and gums ▪ Discuss the effects of weight (gain/loss) on children and adults

Chapter 2 Energy and Nutrients

Contents	Learning Outcomes
2.1. Nutrients • carbohydrates • proteins • fats • minerals • vitamins • water	Students should be able to: ▪ List and define basic nutrients ▪ Describe the functions of each nutrient ▪ Identify the food sources of each nutrient ▪ Discuss the effect of deficiencies of each nutrient
2.2. Energy value of food	▪ Compare energy value of different foods. ▪ Identify proper sources of energy in daily diet ▪ Describe factors affecting energy requirements of the individuals

Chapter 5 Purchase and storage of Food

Contents	Learning Outcomes
5.1. Purchase of Food 5.2. Storage	Students should be able to: ▪ Explain the principle of purchase ▪ Discuss the criteria of purchasing different types of foods ▪ Compare different types of food storage ▪ Explain why food must be properly stored ▪ Enlist correct storage procedures

Chapter 6 Preparation and Cooking

Contents	Learning Outcomes
6.1 Preparation and cooking methods of the following: • milk and milk products • eggs • meat and meat products • vegetable and Fruits • cereals and starch	Students should be able to: ▪ Explain the effects of cooking on color, texture, palatability and digestibility of various foods ▪ Describe the appropriate methods of preparing food ▪ Demonstrate different cooking methods ▪ Select proper cooking methods for different foods ▪ Explain cooking methods which minimizes nutrient losses
6.2. Safety in the Kitchen	▪ Explain importance of the safety measures in the kitchen ▪ Handle minor accidents in the kitchen

Chapter 7 Family and Community Nutrition

Contents	Learning Outcomes
7.1. Nutrition of vulnerable groups in the community	Students should be able to: ▪ Define community nutrition ▪ Define vulnerable groups ▪ Identify nutritional problems of different vulnerable groups. ▪ Discuss the dietary needs of the vulnerable groups: • pregnant and lactating females • infants • preschools • teenagers. • elderly ▪ Select food to meet the additional food requirements of pregnant and lactating mothers ▪ Compare breast-feeding and bottle-feeding. ▪ Compare the choices between home-made and commercial baby foods ▪ Compare healthy snacks vs junk food among teenagers ▪ Modify family diets to suit the food needs of elderly in the family ▪ List various measures for preventing malnutrition ▪ Discuss the prevention of nutrition disorders related to food shortage ▪ Discuss the role of economics in community nutrition
7.2. Preventing malnutrition in community	

	▪ Create awareness through nutrition education ▪ Explain distribution of food in family and community ▪ Discuss the importance of preventing food wastage at family and community levels

Chapter 8 Meal Management

Contents	Learning Outcomes
8.1. Principles of meal planning	Students should be able to: ▪ Define meal planning ▪ Discuss principles of meal planning ▪ Describe the importance of meal planning ▪ Define menu planning
8.2. Menu planning for families of different income levels	▪ Plan menus for three different income levels: • low • middle • high
8.3. Menu planning for different stages (Pregnancy, infancy, early childhood, teenage and elderly)	▪ Plan menus for different stages
8.4. Menu planning for different occasions	▪ Discuss and plan menus for different occasions like eid, birthday etc

Chapter 9 Table Setting and Meal Services

Contents	Learning Outcomes
9.1. Food service and table setting: • formal • buffet • trolley • tray	Students should be able to: ▪ Describe food service ▪ Explain significance of food service. ▪ Enlist the different methods of food service ▪ Select the appropriate methods of food services for different occasions
9.2. Table manners and etiquettes	▪ Describe table manners and etiquettes

Chapter 10 Food Preservation

Contents	Learning Outcomes
	Students should be able to:
9.1. Food preservation	▪ Define preservation ▪ Discuss the importance of food preservation ▪ Explain the principles of preserving food ▪ Compare the different methods of preservation
9.2.Food Spoilage	▪ .Define spoilage ▪ Enlist the different spoiling agents ▪ Explain different methods of controlling food spoilage
9.3. Food Additives	▪ Define additives ▪ List the food additives ▪ Discuss the role of additives in food preservation ▪ Explain food additives in relation to health hazards

PRACTICALS

Description	PRACTIAL/ACTIVITY
Chapter 1 Introduction to the study of Food and Nutrition	▪ Write definition of Food, Nutrition and relevant terms ▪ Enlist basic function of Food in the practical file
Chapter 2 Energy and Nutrients	▪ List the basic Nutrients ▪ Discuss all the Nutrients briefly in the practical file
Chapter 3 Balanced Diet	▪ Draw a Food Pyramid in a practical file
Chapter 4 Nutrient Composition	▪ Make a chart with keeping in mind the nutrient composition of different foods.
Chapter 5 Purchase and storage of food	No practical
Chapter 6 Preparation and Cooking	▪ Plan, prepare and serve any two dishes from the following: • egg cookery • milk cookery • meat cookery • vegetable cookery • cereal cookery ▪ Design a Poster of any common kitchen appliance. The Poster should illustrate appropriate use and care of the appliance and possible danger of mishandling

Chapter 7 Family and Community Nutrition	No practical
Chapter 8 Meal Management	▪ Plan a day's menu in the practical file for different age groups • pregnant and lactating mothers • preschoolers • teenagers • old age ▪ Plan a day's menu in the practical file for different income groups: • low income • middle • income • high income
Chapter 9 Table setting and Meal Services	▪ Practice of different types of table setting and food services such • buffet service • trolley service • tray service
Chapter 10 Food preservation	▪ Applying the principle of food preservation in the preparation of followings. • lemon jelly • apple jam • carrot murraba • tomato ketchup • lemon and orange squash • mango pickles in oil,

	• lemon, green chilies and carrot pickle in vinegar
NOTE: Keeping all practicals in mind	▪ Prepare a checklist to keep a record about the lab activities. ▪ Focus on safety and care of equipments, sanitation, time management, team work, organization of materials and cleaning of work place

FOOD AND NUTRITION PRACTICAL BASIC REQUIREMENTS FOR SCHOOL LABORATORY

EQUIPMENTS

- gas oven/stove
- oil stove
- cooking pans
- measuring equipment
- mixing and preparation equipment
- baking pans and oven dishes
- small electric appliances
- refrigerator
- cutting and chopping equipment
- storage equipment
- dinner ware
- glass ware
- flat ware
- tawa
- pastle and motor/grinding slabs and stones

FACILITIES

- storage area- equipments, dry ingredients, fresh groceries
- cooking area- stoves, water, work area
- washing area- water, sink, material
- waste disposal-bins

NOTE

The number and types of equipment/facilities will be determined by individual school according to the available space and resources. Alternatives can easily be selected to carry out the recommended practicals.

GROUP PROJECTS IN FOOD PRACTIALS:

- working as team member
- personal appearance
- sharing equipment
- becoming acquainted with kitchen
- planning meals
- dividing the work
- preparing the food
- setting the table
- serving the meal
- washing the dishes
- evaluating your self

CARE AND SAFETY IN THE KITCHEN LABORATORY (Demonstrated by the teacher)

- prevent cuts and burns
- avoid falls
- care in using electric and gas appliances
- sanitary habits
- first aid
- handling cleaning agents

CHAPTERWISE PERCENTAGE

Chapter	Weight age %
Chapter 1: Introduction to The Study Of Food and Nutrition	8
Chapter 2: Energy and Nutrients	11
Chapter 3: Balanced Diet	8
Chapter 4: Nutrient Composition	14
Chapter 5: Purchase and Storage of Food	9
Chapter 6 Preparation and cooking	12
Chapter 7: Family and Community Nutrition	9
Chapter 8: Meal Management	9
Chapter 9 : Table Setting and Meal Services	10
Chapter 10: Food Preservation	10
Grand total	**100%**

TEACHING STRATEGIES

A school is a social organization, embedded in a society where it is placed. It is required that the social institution prepares individuals for an active and constructive role in society. It thus becomes important that teaching and learning focuses on developing values and acquiring knowledge, and skills, which are meaningful and applicable. It is imperative that teachers have a clear understanding of the teaching strategies.

Teachers need to ensure that whatever students learn prepares them not only to do well in examinations, but to successfully face the challenges of a global society, and develop their social consciousness to the extent that they become agents of social change. In order to achieve his objective teachers need to adopt innovative instructional strategies.

Avoiding the spoon-feeding style of traditional classroom teaching. The strategies should intellectually engage students of varying degrees of interests, abilities and styles of learning, strengthen their power of reasoning and stimulate their active participation through different activities and exercises.

The following instructional practices can be utilized:

- lecture
- co-operative/collaborative work groups
- discovery
- computer assisted learning
- self directed projects
- multimedia materials
- field trips
- guest Speakers
- writing assignments such as creative writing, essays and written assessments
- group discussions
- creative presentations
- participation in laboratories

Teaching Learning Approaches and Classroom Activities

- The teaching learning approaches should be student-centered. Teachers should enter into partnership with the students in the whole learning process. Each child's self-image as a learner should be well protected, especially when classroom discussions brings the socio-cultural values of the home and the community into high relief.

- Learning should be activity based wherever possible. Some SLOs explicitly require that students bring their own experience and informal researches to the classroom, which they can share with others.
- Rote learning of the concepts and principles of Home Economics should not be encouraged. Teachers should try to develop questions requiring comprehension and higher order skills like application.
- The content has been elaborated in terms of specific learning objectives that will help to broaden student's conceptual understanding and learning of life skills directly relevant to meeting the challenges of 21st century. In particular, care has been taken to recognize the modern life
- Finally, SLOs encourage both teachers and students to concentrate on understanding and application rather then recall and rote learning. The sequence of the topics has been developed to facilitate a deeper and more coherent understanding.

Assessment and Evaluation

The rationale of assessment is to find out whether students have acquired the kind of skills, knowledge, and understanding that we set as goals of the curriculum.

This purpose is traditionally achieved by conducting an examination at the end of the sessions called summative evaluation. Here teachers require students to express their understanding of what has been taught and the performance of students is measured using grade points. This form of assessment is convenient because it is easy to carry out in very little time. However, this form of assessment is a single snap shot and fails to provide opportunity to the student or the teacher to interact during the progression of the session. Thus the student has no opportunity to learn from mistakes. This gap can be filled by utilizing formative assessment, which is an ongoing process throughout the session where students' are not penalized for making mistakes

Assessment Procedures

- formative assessment should be used throughout the session and supplemented with the end of session summative evaluation
- tasks that can help in formative assessment include
    - homework
    - lab reports
    - quizzes
    - tests
    - group discussions
    - oral presentations
    - worksheets
    - puzzles
    - online interactive activities
- feedback on students' work in all of the above tasks must be prompt, effective, and efficient
- assessment should have questions setting that specifically help in finding out the following skills, knowledge and understanding according to Bloom's Taxonomy
    - **recall and retrieve** information related to the contents of the course.

      Leading words for setting questions:

list, define, identify, label, tabulate, name, who, when, where, etc

- **comprehend** the information i.e. do they know what it means .

  Leading words for setting questions:

  interpret, predict, distinguish, differentiate, estimate, discuss ,etc

- **apply** their knowledge i.e. do they know what is it good for.

  Leading words for setting questions:

  demonstrate, show, solve, classify, illustrate, modify, change, discover, etc

- **analyze and synthesize** information i.e. taking things apart and putting things together. Leading words for setting questions:

  Analyze: analyze, separate, explain, arrange, compare, infer, etc

  Synthesize: combine, integrate, rearrange, create, formulate, design, etc

- **Evaluate information** i.e. weighing available options. Leading words for setting questions:

  decide, measure, recommend, select, conclude, compare, summarize, etc

- measure the potential and ability of students to engage in critical thinking
- questions for the final paper should cover the entire range of the syllabus questions types should include MCQs, short answers, and essays
- assessment should focus on students strengths not just weaknesses
- assessment language should be simple, clear and un-ambiguous

Evaluation Strategy:

An external examination is recommended at the end of the course. This evaluation should measure all the domains of learning and through it, the attainment of the objectives can be measured. The Weightage of the different domains of learning is given below:

Learning Domains for Measurement	Weightage In Evaluation
▪ Knowledge, Comprehension, Analysis, Evaluation, Synthesis, Application:	80%
▪ Skills of Communication, Initiating and Planning, Designing Experiments and Interpreting Data:	10%
▪ Manipulative skills (Performing Lab Work)	10%

Weighing of Assessment Objectives

Theory assessment: The theory examination is suggested to consist of a wide variety of questions. The assessment should be designed to examine the candidate's understanding of the whole syllabus and should test the following range of abilities.

Knowledge and Understanding	60%
Higher Abilities (handling information, application and problem solving etc.)	40%

Practical Assessment

This is designed to test experimental skills and investigations.

Suggestions for Structuring Assessment and Evaluation Tools:

More Emphasis should be on;	Less Emphasis should be on;
▪ assessing what is most highly valued	▪ assessing what is easily measured
▪ assessing rich, well-structured knowledge	▪ assessing discrete knowledge
▪ assessing scientific understanding and reasoning	▪ assessing scientific knowledge
▪ assessing to learn what students do understand	▪ assessing to learn what students do not know
▪ assessing achievement and opportunity to learn	▪ assessing only achievement

- assessment pattern is subject to the requirement, policies, and procedures of the Examination Boards
- question paper should be based on the curriculum not on a particular textbook
- questions involving unfamiliar contexts or daily-life experiences may be set to asses candidates' problem-solving and higher-order processing skills. In answering such questions, sufficient information should be given for candidates to understand the situation or context. Candidates are expected to apply their knowledge and skills included in the syllabus to solve the problems

GENERAL INSTRUCTIONS TO AUTHORS

The National Curricula should be a reflection of our national needs and goal. This requirement can be met only if the textbooks are written in accordance with this curriculum. This curriculum meets not only the broad aims and objectives but also achieves the precise requirements of the individual subjects. Keeping these points in view the authors should observe the following points, while writing the textbooks.

- The authors should adhere to the learning outcomes of each concept or chapter as mentioned with the contents in the curricula.
- The permanence of the concepts with the previous classes, their integration and rational growth should be ensured.
- Horizontal and vertical overlap of the concepts should be kept away from. the main document.
- The textbook should be informative and interactive with questions to be put at suitable interval to provoke the students to think.
- The details of the treatment of the concept should be properly classified into headings and subheadings.
- The language used should be simple, clear, straight forward, unambiguous and easily comprehensible by the students of the particular level.
- Simple questions may be asked within the chapter, which requires students to remember, think, and apply what they have just learnt as well as to strengthen the learning of the idea and principle.
- The new progression and expansion in the subjects should be integrated where appropriate.
- The examples and applications should be from every day life and be supportive of our cultural values.
- Photographs and illustrations should be clear, labeled and helpful of the text.
- Tables, flow charts and graph may be given wherever needed.
- Key points at the end of each chapter should provide a summary of the important concepts and principles discussed in the chapter.
- Review questions should be given at the end of each chapter requiring students to recall, think and apply what they have learnt in this chapter.

- This should start from simple questions increasing the density gradually and should test knowledge, understanding and skills of the students. The last few questions should give confidence to the student to apply the concepts studied in this chapter.
- Each chapter should go with its accurate and logical summary to be given at the end of this chapter.

ELECTRONIC INSTRUCTIONAL MATERIAL:

Electronic instructional material is gaining popularity in the developed world. Educational technology providers are successfully marketing courseware with instructional management, assessment, individualized learning paths and professional development. Growing numbers of teachers have convenient and immediate access to entire libraries of instructional video correlated to curriculum. As far the educational scenario in Pakistan and other developing countries is concerned, lack of resources (particularly in schools) would hold back the evolution of electronic publishing in place of or along with printing.

It may be considered that a good ratio of the students of Secondary classes has access to computer technologies. They should be given chances of self learning (rather exploring the knowledge) and it can be made true by converting the data of the IX-X and XI-XII textbooks into electronic formats e.g. CD-ROMs. The CD-ROMs should be made available at the retail outlets. Where students don't have computers at schools/colleges or at homes, they may explore the CD-ROM at internet café, (as they are very much seen at internet cafes wasting their potential while chatting with friends, watching movies etc.)

CHAPTER ORGANIZING SYSTEM

Chapter Organizing system – It should be taken into account that a consistent numbering system leads the students through each chapter at a glance in the beginning to conceptual heading throughout and finally to the summary of key concepts at the end. Each chapter should be organized in the following pattern:

CHAPTER NAME

Outline:

Major Concepts:

- 1.1:::::::::::::::::
- 1.2:::::::::::::::::
- 1.3:::::::::::::::::

Introduction

1.1 MAJOR CONCEPT

(Depth of the topic should be kept with the teaching periods advised in the curriculum)

Tit Bits:

STS Connection

Subheading # 1.1.1

Subheading # 1.1.2

Critical Thinking

Practical Activity:

EXERCISE:

The exercise should include;

- Multiple Choice Questions
- Short Questions
- Extensive Questions

(Questions should be made that can check learning outcomes in all the domains i.e. knowledge, comprehension, application, evaluation, synthesis and connection with technology and society.)

GLOSSARY

This glossary is intended to ensure that terms commonly used in the context of learning outcomes and assessment are appropriately interpreted so that no confusion what-so-ever arises in their use.

These words are listed below along with their contextual meaning.

We urge the users of these terms to strictly follow this glossary and associate meanings to the key words as given in this glossary.

- **Analyze,** to separate into parts or basic principles so as to determine the nature of the whole, examine methodically.
- **Compare** requires candidates to provide both similarities and differences between things or concepts.
- **Create,** to produce through imaginative effort.
- **Deduce/Predict** implies that candidates are not expected to produce the required answer by recall but by making a logical connection between other pieces of information. Such information may be wholly given in the question or may depend on answers extracted in an earlier part of the question.
- **Describe** requires candidates to state in words (using diagrams where appropriate) the main points of the topic. It is often used with reference either to particular phenomena or to particular experiments. In the former instance, the term usually implies that the answer should include reference to (visual) observations associated with the phenomena. The amount of description intended should be interpreted in the light of the indicated mark value.
- **Discuss** requires candidates to give a critical account of the points involved in the topic.
- **Define (the term(s)**...) is intended literally. Only a formal statement or equivalent paraphrase, such as the defining equation with symbols identified, being required.
- **Enumerate,** To count off or name one by one; list:
- **Estimate** implies a reasoned order of magnitude statement or calculation of the quantity concerned. Candidates should make such simplifying assumptions as may be necessary about points of principle and about the values of quantities not otherwise included in the question.

- **Explain** may imply reasoning or some reference to theory, depending on the context.
- **Justify,** to demonstrate or prove to be just right, or valid.
- **List** requires a number of points with no elaboration. Where a given number of points are specified, this should not be exceeded.
- **Locate,** To determine or specify the position or limits of.
- **Outline,** A line marking the outer contours or boundaries of an object or a figure. **b.** The shape of an object or a figure.
- **Recognize**, to know to be something that has been perceived before
- **Recommend** To praise or commend (one) to another as being worthy or desirable.
- **Relate,** to bring into or link in logical or natural association.
- **Show** is used where a candidate is expected to derive a given result. It is important that the terms being used by candidates be stated explicitly and that all stages in the derivation are stated clearly.
- **Sketch**, when applied to graph work, implies that the shape and/or position of the curve need only be qualitatively correct. However, candidates should be aware that, depending on the context, some quantitative aspects may be looked for, e.g. passing through the origin, having an intercept, asymptote or discontinuity at a particular value. On a sketch graph, it is essential that candidates clearly indicate what is being plotted on each axis.
- **Sketch**, when applied to diagrams, implies that a simple, freehand drawing is acceptable; nevertheless, care should be taken over proportions and the clear exposition of important details.
- **State** implies a concise answer with little or no supporting argument, e.g. a numerical answer that can be obtained 'by inspection'.
- **Suggest** is used in two main contexts. It may either imply that there is no unique answer or that candidates are expected to apply their general knowledge to a 'novel' situation, one that formally may not be 'in the syllabi'.
- **What is meant by** ... normally implies that a definition should be given, together with some relevant comment on the significance or context of the term(s) concerned, especially where two or more terms are included in the question. The amount of supplementary comment intended should be interpreted in the light of the indicated mark value.

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