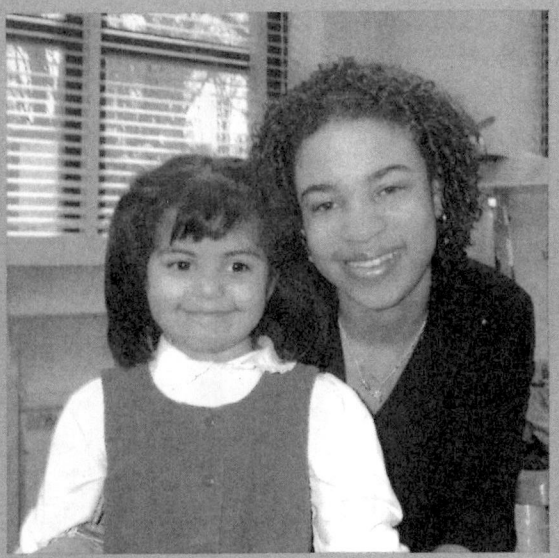
# FAMILY AND CONSUMER SCIENCES

## A Facility Planning and Design Guide for School Systems



**Maryland State Department of Education** **2001**

# Family and Consumer Sciences
# A Facility Planning and Design Guide for School Systems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Cover photographs: (Left) Watkins Mill High School, Montgomery County Public Schools;
(Right) Einstein High School, Montgomery County Public Schools

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# FOREWORD

We live in an ever-changing world. It is a world that needs its global citizens to be caretakers and good managers of its vast resources. It is a world that is enriched from the ideas and services of a multicultural population. The ability to grow and develop into individuals who contribute to the betterment of society begins with the family.

The focus of the Family and Consumer Sciences profession is the family. It is concerned with empowering individuals, strengthening families and enabling communities. Family and Consumer Sciences Education fosters growth of individuals by placing the healthy interaction of family members at the core of its instruction. Family and Consumer Sciences instructors recognize that a central role of education is to offer a curriculum that provides students with basic understandings and skills needed to function effectively in society.

Technology is changing the way we work, communicate with each other, and buy and consume products. Thus, the ability to balance work and family life is becoming more difficult. Our youth need to be equipped with the skills necessary to address the enduring questions of personal and family living.

Through interactive, hands-on experiences in a well-designed family and consumer sciences laboratory, students will become informed citizens able to make reasoned decisions which enhance the quality of daily life in the areas of resource management; living environments; nutrition and food; individual, child and family development; and textiles. The design and equipping of a laboratory is a major element in the delivery of an effective program.

I am pleased to provide these design guidelines to assist in planning family and consumer sciences facilities.

Nancy S. Grasmick
State Superintendent of Schools

# Chapter 1

# Family and Consumer Sciences Education

The focus of Family and Consumer Sciences Education (FCSE) is strengthening the quality of living for family members in society. This is achieved by developing skills needed to be proactive in the work of the family, and fostering thinking that generates ethical action (Laster, 1998). FCSE is an instructional program that supports the study of human interaction with the physical, social, emotional and intellectual environments and the developmental stages and needs of individuals in the interrelated areas of family, workplace and community (The American Association of Family and Consumer Sciences, 2000). The teaching structure for FCSE uses a critical thinking, problem-solving process.

Historically a foundation component of career and technology education, FCSE has primarily prepared students for the work of the family. As societal trends have shifted to more people in the workplace, FCSE is responding by linking its curriculum to the needs of the global economy. In preparing students for the workplace, FCSE must also teach students the importance of balancing work and family life.

The FCSE program is divided into career and technology education (occupational) programs and comprehensive (non-occupational) courses. In career and technology education programs, students develop the knowledge and skills required for individual problem solving and industry related skills leading to careers and further education. Comprehensive courses, common in middle schools but also included in high schools, develop the skills required for making decisions for individuals and families.

Whether preparing students to function in a family or for the world of work, FCSE continues to adapt to changing demographics, new content areas, more flexible classroom design and instructional practices that actively engage students in the educational process.

## Family and Consumer Sciences in Maryland

A convergence of five factors shapes Maryland FCSE programs:

- National FCSE standards including a philosophy, vision, and a framework;
- The FCSE Maryland curricular framework and outcomes;
- Maryland graduation requirements and education policies;
- Maryland school reform initiatives; and
- Revisions to federal legislation and state policies.

## 1. Family and Consumer Sciences Philosophy, Vision, and Standards

**Philosophy:** The family is the setting in which individuals gain their basic learning in preparation for a productive, rewarding life. The following list of core values strengthens the philosophy and provides the focus of FCSE in Maryland:

- *The family is the fundamental social unit.*
- *The issues of families and consumers—globally and in the community—are best addressed within holistic, interdisciplinary and integrative perspectives.*
- *A healthy global environment impacts the human condition. Individuals must engage in reciprocal, quality-of-life relationships with their environment.*
- *Learning and development is a life-long commitment.*
- *Diversity, equality, and human rights are quality-of-life requisites.*
- *Research is the base for new and/or expanding knowledge.*
- *The problems of individuals, families, and communities are ideally solved through innovation, creativity, and application of research.*
- *The profession is a force in shaping public policy.*
- *Partnerships and collaborations with others who share these values and purposes accomplish mutual goals.*

(The American Association of Family and Consumer Sciences Strategic Plan, 2000)

**Vision:** Family and Consumer Sciences Education empowers individuals and families across the life span to manage the challenges of living and working in a diverse global society. The unique focus is on families, work, and their interrelationships (National Standards for Family and Consumer Sciences Education).

**National Standards:** Family and Consumer Sciences National Standards were developed in 1998. Designed to guide FCSE program planning nationwide, the standards are comprised of 16 areas of study.

**Career, Community, and Family Connections**
1.0 Integrate multiple life roles and responsibilities in family, work, and community settings.

**Consumer and Family Resources**
2.0 Evaluate management practices related to the human, economic, and environmental resources.

**Consumer Services**
3.0 Integrate knowledge, skills, and practices required for careers in consumer services.

**Early Childhood, Education, and Services**
4.0 Integrate knowledge, skills, and practices required for careers in early childhood, education, and services.

**Facilities Management and Maintenance**
5.0 Integrate knowledge, skills, and practices required for careers in facilities management and maintenance.

**Family**
6.0 Evaluate the significance of family and its impact on the well-being of individuals and society.

**Family and Community Services**
7.0 Integrate knowledge, skills, and practices required for careers in family and community services.

**Food Production Services**
8.0 Integrate knowledge, skills, and practices required for careers in food production and services.

**Food Science, Dietetics, and Nutrition**
9.0 Integrate knowledge, skills, and practices required for careers in food science, dietetics, and nutrition.

**Hospitality, Tourism, and Recreation**
10.0 Integrate knowledge, skills, and practices required for careers in hospitality, tourism, and recreation.

**Housing, Interiors, and Furnishings**
11.0 Integrate knowledge, skills, and practices required for careers in housing, interiors, and furnishings.

**Human Development**
12.0 Analyze factors that impact human growth and development.

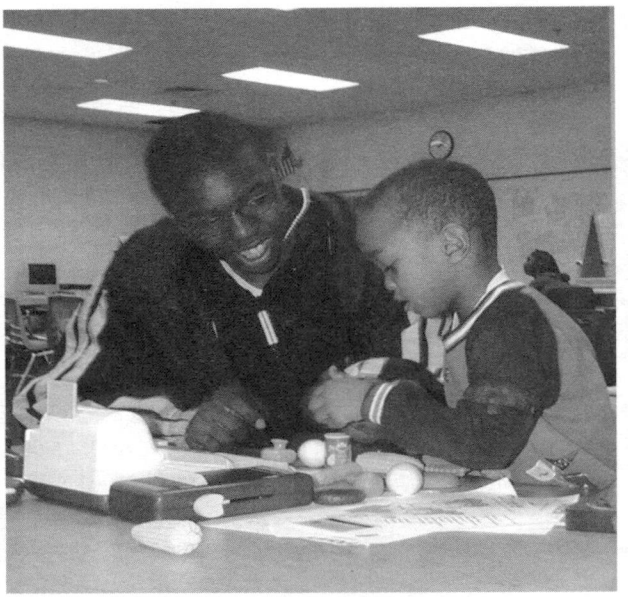
**Interpersonal Relationships**
13.0 Demonstrate respectful and caring relationships in the family, workplace, and community.

**Nutrition and Wellness**
14.0 Demonstrate nutrition and wellness practices that enhance individual and family well-being.

**Parenting**
15.0 Evaluate the impact of parenting roles and responsibilities in strengthening the well-being of individuals and families.

**Textiles and Apparel**
16.0 Integrate knowledge, skills, and practices required for careers in textiles and apparel.

Accompanying each area of study are academic proficiencies, competencies, and organizing processes. Academic proficiencies are essential skills in English, mathematics, and science; they are to be integrated throughout all FCSE programs. The national standards support the content areas identified in Maryland's FCSE Curricular Framework and are reflected in the FCSE curricula and instructional programs. Comprehensive course areas prepare all students for the work of the family enabling them to become productive, proactive, responsible family members. These areas are included in all middle school and comprehensive high school FCSE courses.



*Charles Flowers High School*
*Prince George's County Public Schools*

The occupational standard areas prepare students for careers and postsecondary education. The programs are offered in comprehensive high schools and regional career and technology education centers. Most Maryland local school systems offer FCSE career and technology education programs in Early Childhood Education and Services, Food Science, Dietetics, and Nutrition, and Family and Consumer Services. However, no school system currently offers programs in all of the standard areas.

In recent years, FCSE programs have increased collaboration among curriculum areas in order to offer career and technology education programs leading to broad-based career ladders (i.e., business and FCSE departments collaborating to offer Retail Merchandising and Visual Presentation). It is anticipated that this trend will continue to be encouraged by the Maryland State Department of Education as well as business/industries within the state. This direction makes it imperative for instructors of single-focus FCSE areas to connect with colleagues in other content areas such as business education, art and design, and technology education in order to provide students with relevant postsecondary and career opportunities.

## 2. Maryland Family and Consumer Sciences Outcomes

### The Maryland Curriculum Framework: State Learner Outcomes

The national Family and Consumer Sciences Division of the Association for Career and Technical Education (ACTE) developed the vision, mission, goals and standards for FCSE. Moreover, Maryland's Family and Consumer Sciences Curricular Framework (1995) identified outcomes that have formed the basis for curricula revision and new program development.

- Students will demonstrate an understanding of the relationships among individuals, family and society in order to make decisions which are in the best interest of self, family and society.
- Students will demonstrate knowledge and skills regarding resource management; living environments; individual, child and family development; nutrition and food; and textiles to make decisions which enhance the quality of life for individuals and families.
- Students will solve practical problems using critical and creative thinking in order to achieve individual, family and societal goals.
- Students will apply the knowledge and experience gained in family and consumer sciences in order to identify, explore and prepare for potential careers.
- Students will demonstrate an understanding of current and emerging technologies and their impact in order to make informed decisions about using technology to enhance individual, family and societal goals.
- Students will demonstrate knowledge of diverse populations in order to be sensitive to, and interact appropriately, with others.

- Students will apply concepts and skills from English, mathematics, science, social studies, and other disciplines to solve practical problems in order to empower individuals, strengthen families and enable communities.

## 3. Maryland Graduation Requirements

FCSE programs assist Maryland students in meeting graduation requirements by awarding credit for career and technology education programs, service learning, and health education.

• **Career and Technology Education Programs:** High school students can fulfill one of the graduation requirements by completing a sequence of courses within a specific career and technology education (CTE) program with an industry focus. Typically, these programs are framed under one of Maryland's ten career cluster areas:

- Consumer Service, Hospitality and Tourism
- Health and Biosciences
- Business Management and Finance
- Arts, Media and Communication
- Manufacturing, Engineering Technology
- Transportation Technologies
- Information Technology
- Human Resource Services
- Environmental, Agricultural and Natural Resources
- Construction and Development

CTE programs provide high school students with a coherent set of academic, employability and technical skills that are based on national and state standards. These skills are designed to add value to students' overall education program. State approved CTE programs must be guided by the following core principles:

- *CTE programs should be developed in response to an identified opportunity to add value to students' overall educational programs.*
- *Economic market demand, both current and projected, should constitute the criteria for identifying value added opportunities.*
- *CTE programs should be developed in conjunction with all relevant stakeholder groups.*
- *CTE programs should be organized under broad clusters, based on all aspects of an industry, designed to help students make informed decisions regarding career pathways.*
- *CTE programs should provide multiple options for students.*
- *CTE programs should be measured against student attainment of rigorous academic, employability and technical skills.*
- *CTE programs should be based on the most appropriate, reliable and valid standards available.*
- *Outcome data for CTE programs should be reported and used for continuous program improvement.*

In FCSE, course sequences in child development, food science and nutrition science, and design and merchandising are state approved programs that fulfill CTE completer program graduation requirements. High-quality FCSE programs often culminate in assessments leading to students receiving credentialing or industry certifications. Advisory committees can help keep CTE programs current through the validation of skill standards and identification of related academic and employability skills needed by employees. Furthermore, industry representatives are advocates for obtaining state-of-the-art facilities, equipment, and supplies for CTE programs. Employers can also help to inform educators about their workforce and economic needs to ensure that graduates are entering careers in demand.

• **Service Learning:** Service learning education develops responsible citizens by engaging students in service beneficial to their communities that includes academic preparation and structured reflection. Maryland requires all public school students to engage in service learning activities as a pre-requisite for high school graduation, and all 24 Maryland school systems infuse service-learning into existing courses as all or part of their plan. In many school systems, students earn service learning hours by engaging in activities through their FCSE courses.

• **Health Education:** Health education is a broadly based K-12 instructional program that prepares students to lead healthy lifestyles. FCSE programs are held accountable by some local school systems for ensuring that students achieve the following goals:

- Gain knowledge and skills that lead to an understanding about self and relationships with others;
- Acquire and apply knowledge of tobacco, alcohol, and other drugs and the consequences of their non-use, use, and abuse;
- Adopt sound personal health practices and make appropriate use of health care products, services, and community resources;
- Understand the value of achieving a healthy lifestyle through the development and application of responsible nutritional and fitness behaviors;
- Develop an understanding of behavior and skills that promote safe living in the home, school, and community; and;
- Recognize the family as a basic unit of society that perpetuates life and promotes healthy growth and development .

Code of Maryland Regulations (13A.18.02) under the authority of the Annotated Code of Maryland (§§2-205 (h), 7-204, 7-407, 7-409, and 7-411)

## 4. Maryland Education Reform Initiatives/Maryland School Performance Program

The Maryland School Performance Assessment Program (MSPAP) is the driving force for instructional improvement in the elementary and middle schools. The program challenges schools to boost the ability of all students to learn the basic skills and to apply them to real-life situations. Maryland's next step in school reform is improvements at the high school level, led by the implementation of an assessment program that extends the high expectations of the MSPAP through grade 12. Instructional improvements include curricula revisions in the core content areas, infusion of *Skills for Success* core learning goals into all high school courses and increased professional development options for staff members. FCSE programs support Maryland reform through a family-focused and problem-solving framework, and an integrated academic program that reinforces the foundation knowledge and skills of English, mathematics, science, and social studies.

## 5. National Legislation and State Policies

### Carl D. Perkins Vocational and Technical Education Act

The Carl D. Perkins Vocational and Technical Education Act serves as an additional funding source to FCSE programs with guidelines that support occupational curriculum enhancement and require a performance-based accountability system. Funding supports state leadership, curriculum and professional development initiatives and equipment purchases to improve student achievement.

### State Categorical Funds

The Maryland General Assembly authorized a set aside from each local school system's share of basic current expense aid for CTE programs that are approved by the Maryland State Department of Education. The objectives of

these funds are to provide additional monies to improve and expand CTE programs. Federal funds may be used to support state approved FCSE programs for extended-day or extended-year programs and to update occupational program laboratories including the:

1. Acquisition, repair, or replacement of equipment;

2. Acquisition of tools, supplies, and instructional materials; and

3. Technical upgrade of instructional staff.

Code of Maryland Regulations (13A.04.02.02) under the authority of the Annotated Code of Maryland (§5-202(f))

**Multicultural Education Bylaw**

Assurance of success for students of all cultures, races, gender, ages, socio-economic status, religions, ethnicity, and disabilities is the aim of Maryland's Multicultural Education Bylaw. This law also is reinforced in Maryland's Family and Consumer Sciences Curricular Framework that states in one of its learner outcomes, "Students will demonstrate knowledge of diverse populations in order to be sensitive to and interact appropriately with others."

Code of Maryland Regulations (13A.04.05) under the authority of the Annotated Code of Maryland (§2-205(c) and (h))

**World of Work Competencies**

As part of a student's instructional program, he or she shall have an opportunity to:

- Develop and update an individual career plan for at least two consecutive years;
- Participate in job interviewing simulations; and
- Complete a qualifications brief or resumé acceptable for seeking employment.

As a learner outcome in Maryland's Family and Consumer Sciences Curricular Framework, career exploration is integral in FCSE. Students are expected to apply the knowledge and experience gained in FCSE in order to identify, explore and prepare for potential careers.

Code of Maryland Regulations (13A.04.10.01) under the authority of the Annotated Code of Maryland (§2-205(h))

## Impact of Factors

The five factors previously discussed have had an impact on FCSE particularly in the occupational areas. All FCSE programs should be experiential, hands-on and integrate core academic areas. FCSE career and technology education programs are required to include interdisciplinary approaches to delivering instruction with work-based learning experiences and performance outcomes. Programs should add value to the students' learning experience through credentialing and preparation for postsecondary educational opportunities. These factors are important to people in determining curricula revisions and ongoing program improvement. They will contribute to a more unified FCSE program, consistent with other content areas. Newer curricula will include more focus on process with less emphasis on individual products.

FCSE, as in some other content areas, also faces teacher shortages. Maryland has developed emergency certification to address the need. FCSE must adapt and accommodate a new framework while preserving the distinctive essentials of a core philosophy. Ellen Swallow Richards, in 1899, commented on the need for flexibility in home economics: "Real progress is often retarded by trying to fit into the old scheme of things." (Stage and Vincenti, 1999).

## Organization of FCSE Content

In Maryland, FCSE is offered at the middle school and high school levels. When introduced in the middle school, FCSE courses are non-occupational and comprehensive. At the high school level, coursework is more specialized within a specific content area and provides career-focused opportunities.

## Middle School

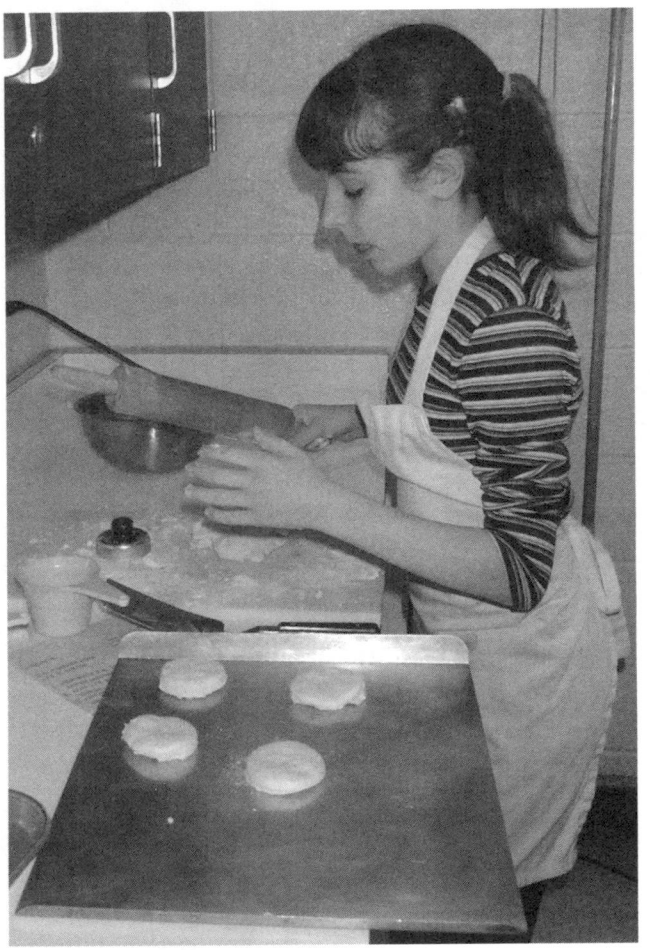
The purpose of the middle school program is to establish life-long patterns for individual and family well-being. FCSE at this level is characterized by the term "exploration." Students investigate essential questions of personal and family living. Through a family-focused and problem-solving framework, FCSE middle school courses are performance-based and require students to apply the basic skills of math, science, and English to address the perennial concerns of personal and family living. FCSE supports the MSPAP program when activities are designed and instruction is delivered to help students:

- Read to perform a task;
- Read for information;
- Justify why an answer or approach to a problem is reasonable;
- Make predictions or draw conclusions from available information;
- Analyze statements and provide examples which support or refute them;
- Judge the validity of arguments by applying inductive and deductive thinking;
  - Inductive: inference by reasoning from the specific to the general.
  - Deductive: inference by reasoning from the general to the specific.
- Identify mathematical concepts and processes as they apply to other content areas;
- Use information to identify and define the question(s) within a problem;
- Make a plan and decide what information and steps are needed to solve the problem;
- Organize, interpret, and use relevant information;
- Select and use appropriate tools and technology;
- Identify alternate ways to find a solution; and
- Apply what was learned to a new problem (School Improvement in Maryland, 2001)

In many school systems, FCSE is the venue for students to explore careers and to focus their interest in a career cluster. FCSE has a unique and valuable contribution to make in the education of middle school youngsters and should be an integral component of every middle school program (Redick, 1998).

## High School

In Maryland, CTE programs are developed and implemented to increase the academic, career and technical skills of students in order to prepare them for careers and further education. In addition to this, FCSE programs also prepare students for competence in the work of the family. In high school, the programs include CTE and comprehensive courses. The curricula infuse *Skills for Success*, academic core learning goals, and research-based instructional activities that support the Maryland High School Assessment Program.



*Hereford Middle School*
*Baltimore County Public Schools*

# Chapter 2

## Family and Consumer Sciences Education Trends

**"To succeed in the 21st Century, our nation must be prepared to adapt to changes in our economy - in how we work, where we work, and how we balance our professional and family lives."**

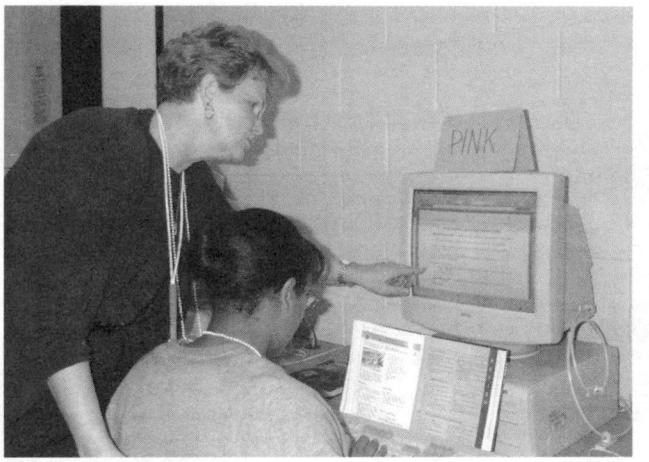
- United States Labor Secretary Elaine L. Chao, 2001

Fundamental to a democracy is an educated and engaged citizenry - adults capable of contributing to an economy that provides its people the goods and services needed or wanted. At the same time, these adults must be capable of doing important public and civic work that holds society together. They must be capable of doing important private work that builds strong families, competent youth and caring communities. Essential to an educated and engaged citizenry are strong, stable families able to support the growth and development of this workforce and citizenry. Families are the foundation of society - the basic social units in which individuals learn values and find care.

Daily, schools receive children and youth who are not fully able to learn, children who are undernourished and undernurtured. Teachers struggle to find methods to reach and to teach the next generation of workers and citizens who bring assets and liabilities to the school, gained or not gained in their homes through their families.

Challenging social environments are producing a generation of young people confronted by the outcomes of poor nutrition and inadequate physical exercise including the leading health problem of obesity and other life-affecting illnesses and disabilities. Brain development and the ability to learn throughout life are affected by the nutritional intake and environmental stimuli found first in the home. Resulting poor health leads to decreased worker productivity and increased health care costs, thus creating a burden on society. These environments are producing a generation that takes out hostilities against the broader community. Conflict and emotion management are ineffectively learned as evidenced by the violence and alternative behaviors exhibited by more and more youth. Negative behavior carries over into the workplace and back into the home — which is becoming the site of increasing violence.

The learner repeats behavior learned in the home. If children are mistreated, neglected or abused, or less than adequately parented, they will likely repeat that behavior as they become adults and/or parents. Consequently, parents unable to optimally function do not serve society well. The cost of their lack of competence is borne not only by family members but also by society through costs incurred, opportunities and capabilities lost. The extent to which families are fully functioning - or fragmented and fragile - is determining, in large measure, outcomes and consequences for the next three generations.

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*Prince George's County Public Schools*

The role of families is acknowledged as being critical to a strong vibrant society and economy. Current policy initiatives, from welfare to health care to educational reform, reflect this acknowledgment. Developing productive, contributing citizens able to effectively function and sustain a democratic society is the focus of the U.S. educational system.

## Family and Consumer Sciences Education

This chapter identifies several trends emerging that impact upon curricula and facilities planning. Producing capable, productive adults of positive character, able to function in the public arena, as citizens and workers, and in the private arena, as volunteers and family members, is the goal of Family Consumer Sciences Education. With the cognitive, affective and skill development learned through classes in FCSE, youth can navigate through trends that are changing the nature and dynamics of society. Youth can build on the assets and strengths of their families. Youth can learn to appreciate the differences of the increasing diversity of cultures that are infusing this country.

From FCSE, these youth can gain specific life skills which will prepare them for participation in families, their communities, continuing education, volunteer and wage work as well as the democratic system that is the basis for our political system. They can:

- Develop personal and career skills,
- Explore career options,
- Enhance communication skills,
- Acquire such basic skills as financial management, consumer decision making, childcare and parenting competencies,
- Become stewards of the environment,
- Strengthen ties that support and bind people of similarities and differences, and
- Learn resiliency skills to prevent and overcome the challenges and crises of life.

Today's youth need to develop this portfolio of competencies more than any previous generation. Trends speak to the dynamic urgency of capably handling the challenges of change.

## Trends

According to the American Association of Family and Consumer Sciences, an environmental scan identified the following external influences and trends (Baugher, Anderson, Green, Shane, Jolly, Miles and Nickols, 2000):

- **Aging of the population:** By 2030, over half of all U.S. adults will be eligible to join the American Association of Retired Persons which means they will be age 50 or greater. At the same time, a baby boom is projected.

- **Digital technology:** The information revolution is transforming society and creating new careers, new industries, and new ways of working, living, and learning.

- **Genetically modified products:** Genome research, DNA knowledge, and genetically modified products will contribute to new alternatives for preventing and treating diseases. Nutritionally enhanced fruits and vegetables will influence weight control and improved health practices.

- **An altered institution - The American Family:** The majority of families with children will raise them without the presence of both biological parents. Families are smaller. Marriage is less central. The proportion of adults who never have been married rose from 15 percent in 1972 to 23 percent in 1998.

- **Protecting the environment while accommodating growth:** Healthy ecological neighborhoods depend on sustainable practices.

- **No majority ethnic group:** By 2020, this country will not have a majority ethnic or racial group and will be more diverse than ever.

- **Work life:** There are more variations in career choice: The number of women starting their own businesses continues to increase. A person may live in one part of the country and be employed in another. People plan to work in some capacity following retirement.

- **Dualistic society:** A high school diploma is crucial and fundamental for economic security. The gap in income between the well-to-do and the poor continues to grow larger.

- **Globalization:** Digital technology links the world and the decisions made in one country while influencing what occurs in others.

- **Focus on community:** Even though global forces impact what happens with individuals and families, communities foster a sense of belonging and provide "high touch" environments that support well-being.

These trends are reinforced by the following statistics (Futurework, 1999):

1. Baby boomers make up almost half (47%) of the workforce today (ages 37 to 55).

2. Young women are enrolling in college at a higher rate (70%) than young men (64%)

3. Young people hold an average of nine jobs before age 32.

4. Employed mothers with children under age 13 miss an average of 6.4 workdays a year due to family-related issues.

5. From 1969 to 1996, families, on average, experienced a decrease of 22 hours a week (or 14% percent) of available parental time to spend with their children.

Many of these trends are impacting the development and delivery of Family and Consumer Sciences curricula. Therefore, the competencies that young people will need to navigate successfully throughout their life cycle will be more considerable.

## Aging

**Trend**

The graying of America brings with it personal and societal challenges as well as opportunities for accommodating a growing senior population. In 1996, the United States Department of Labor predicted the number of American households providing informal care to a relative or friend age 50 or older will exceed 40 percent by 2001 (Futurework, 1999). Aging populations portend increased health costs, a changing worker-to-retiree support ratio and potential conflicts as well as opportunities to build on the wisdom of the elderly. Through FCSE, students can better deal with and understand intergenerational issues.

**Curriculum Implications**

In FCSE, youth can study the political, socio-economic and biological effects of aging on themselves and on the adults around them. They can engage in public policy debates about current issues and how to make their views known including important healthcare issues that affect the elderly including elder care, health insurance, retirement and lifestyle changes. Plus, they can learn the assets older adults have, including time and wisdom, through intergenerational learning activities offered by FCSE.

In FCSE classes, youth can study careers, and/or develop skills, emerging in an economy affected by increased demands for goods and services of an aging population. They can put their imaginations and energies to use in designing and developing innovations with marketplace applications in FCSE classrooms built to foster applied science through invention.

## Changing Family Structure

**Trend**

The family structure has undergone a dramatic transformation including: increased life span, new patterns of work, the family life cycle, marriage patterns, economic viability, and child rearing and aging practices. Issues of health care and child safety are more critical in a society where the majority of mothers, fathers and caregivers work while young children spend more time in daycare and in before- and after-school programs. Increasingly, society is learning that sound families provide benefits not captured in the gross national product. Recent reforms in policies regarding how families can ideally become economically self-sufficient are an indicator of this recognition.

A second indicator is the recognition that it is not enough for people to have skills for gainful employment but that they must be financially literate. A study by the National Council on Economic Education indicates that the majority of students cannot pass a basic economic literacy test (National Council on Economic Education, 1999).

A third indicator of the importance of sound families is the movement encouraging education to provide youth with necessary skills to form an enduring marriage and to maintain those skills over a life span.

A fourth indicator of the value of strong families is the fatherhood initiative. This is based on research that established that children benefit economically and socially by skilled mothers and fathers who bring diverse and complementary abilities to parenting, thus, the need for parenting education (National Fatherhood Initiative, 2001).

A fifth indicator of the importance of families is the growing body of knowledge about the relationship of sound nutrition and safe food handling to good mental and physical health. Poor eating and food handling habits are costing Americans time and energy lost to debilitating diseases and disabilities. Programs directed toward nutrition education aimed at stemming the tide of nutritional illiteracy are increasing.

**Curriculum Implications**

It is not enough to recognize how the structure of the family is changing. FCSE programs will need to prepare students for an ever-changing, ever-evolving family. The focus will have to be on family functions, strengths and resiliency. Students need to be able to examine their own families and their individual role and responsibilities within their families. Concurrently, students must be exposed to the practical day-to-day functions that maintain healthy family lifestyles such as:

- Managing personal finances - learning to save, avoiding credit card debt, balancing checking accounts, acquiring good credit, obtaining health and life insurance and evaluating investment plans.
- Balancing work and family life - technological advances in communities have allowed more people to work from within their homes and to be more accessible to their work sites during off-duty hours. Thus, learning to balance the time spent working and with family is more critical.
- Employing a family regimen of good nutrition and exercise.

FCSE has extensive experience in teaching the content of interpersonal and family relations; consumer economics and financial management; foods and nutrition both for personal applications and for career development. The impact of the change on individuals and families and family functions will continue to be a focus of FCSE programs.

## Changing Patterns of Consumerism

**Trend**

Consumers are inundated with decisions among competing products and services more than ever before. From brands and types of orange juice to telephone services to over-the-counter medications, the options are overwhelming. Furthermore, consumer habits are changing due to the rapid growth of e-commerce. Today's economy requires a more educated consumer– one who can do research and evaluate a product's value based on his or her personal needs.

**Curriculum Implications**

Preparing competent, critical thinkers who can make reasoned consumer decisions is a priority for FCSE programs. Previously, creating a product was the objective for students in a FCSE classroom. Students need less time producing products and more time in action-related research and discussion. FCSE provides an environment where students can make decisions about products and services, analyze their reasons for making their decisions, investigate the consequences and reevaluate their original choices. For example, students can compare and contrast the products and services of financial institutions or learn the different options for financing a four-year college

degree. Through e-commerce, self-service has increased tremendously. Students need to recognize and avoid potential fraudulent situations. Thus, it is imperative that students understand consumer protection laws and gain practical applications in using them.

## Emerging Biotechnology

**Trend**

Biotechnology is already a presence in our lives and will become even more prevalent. It refers to the techniques that allow scientists to modify Deoxyribonucleic Acid (DNA), the genetic material of living things. Agricultural biotechnology may hold promise for improving the productivity and environmental sustainability of food and fiber productions (U.S. Food and Drug Administration, 1994). By manipulating the DNA in plants and vegetables, scientists are creating food crops that are resistant to disease and insects. Advocates of biotechnology believe this science will help eliminate world hunger specifically in countries like Africa and Asia where famine is rampant. Moreover, biotechnology is ushering in a new economy - the bioeconomy. By 2020, the bioeconomy will replace the information economy (Davis and Meyer, 2000). According to Davis and Meyer, companies will develop chips that digitize smell and will develop medical devices that smell and isolate diseases. In the years to come, biotechnology and the bioeconomy will have a great impact on pharmaceuticals, health care, agriculture and food industries.

**Curriculum Implications**

As with any emerging science, biotechnology is raising a great deal of questions. How does it work? What are the benefits and consequences of biotechnology? Can it be regulated so that it does not negatively effect the health of people and animals? What impact will it have on the environment? Bioethics is the moral and ethical study of these issues and is an appropriate area of study in FCSE. Bioethics becomes more relevant and compelling to students when they study topics like injecting cows with hormones to increase their milk production or using fetal tissue to help someone afflicted with Parkinson's disease. As students study issues like these, they can also gain insights into laws and regulations that advocate and/or limit the uses of biotechnology. Consequently, as the economy shifts to a bioeconomy, these questions will have greater significance in students' lives.

The study of bioethics provides a forum to students to evaluate and affirm their personal values in solving moral and ethical problems. FCSE will allow students to study the ramifications that biotechnology will have on their changing world such as, how genetically altered foods will affect their eating and buying habits or the impact that biotechnology will have on the environment and other species. Through FCSE, students are gaining insights into the complex issues that will impact upon their lives in the future.

## Global Interdependence and Multiculturalism

**Trend**

The importing and exporting of goods and services is increasing exponentially among countries. As countries link more of their economies to each other, the effect is an establishment of an interdependent network. It is increasingly clear that global economic issues and their considerable social, political and financial impact have become the dominant forces for change (Global Interdependence Center). The increase in globalization will not only impact the type of work being done in America but the type of employee needed to do that work. The greater need for a highly skilled, adaptive workforce will parallel a decreasing demand for low skilled workers.

Corresponding to the trend of global interdependence is an increase in ethnically diverse schools, neighborhoods and communities. The latest census confirms the changing racial makeup of the population growth in the U.S. For the first time, people self-identified themselves as "multi-racial." America will be many faces and many races with no one majority group in the workforce. With immigrants

settling not just in urban areas but in both suburban and rural areas, "The question is not will there be change but how will that change be managed so all may benefit." (Futurework, 1999)

Both within and outside of schools, teamwork will play a larger role in the schools of the future. Collaboration with colleagues, social agencies, families, business, industry, labor, and higher education must be expanded. It is essential for FCSE educators to form partnerships and alliances and to make interdisciplinary connections where broad based team members address shared concerns and mutually reinforce one another's initiatives.

**Curriculum Implications**

Youth, in families where parents are struggling to accommodate the ways of their new country with the ways of their old, can be helped in FCSE classes. Youth lacking appreciation of those with different ways can develop the ability to interact appropriately with diverse people in sound FCSE programs. These programs emphasize respect, conflict management, communication skills, appreciation and understanding of different ways of living and working.

Increased linkage of school with health and social services may provide opportunities for FCSE programs to move beyond the classroom and serve a greater diversity of clients needing targeted assistance/education in the work of the family for learning. Learning will occur both in a school building and in the community. As business and community involvement increase in FCSE programs, the students' learning will be more directed to solving real-world problems. Another benefit in forming partnerships with industry is in the donation of science, workplace, and laboratory equipment. This helps to ensure students' learning environments are current and relevant. This trend may well ripple out to other secondary programs as internships and other work-related activities expand in high schools across Maryland. While FCSE programs have a unique family focus, they also overlap with and relate to other content areas. Interdisciplinary teaching must be promoted for students to address the multi-faceted aspects of family and community problems.

## Facility Implications

There are four major factors for consideration in future FCSE facilities based on trend predictions:

**Flexible Room Designs**

Classrooms must allow for changes to curricula content and instructional methods. A flexible, student-centered learning environment, which allows students to work individually and cooperatively in teams on problem-solving activities, will be critical to the formation of strong interpersonal relationship skills. Projects that involve independent and group research and study will necessitate flexible classroom space arrangements with movable equipment and furniture. A flexible room design will encourage the development of a learning community within the classroom. For example, modular computer laboratories with instructor-developed curriculum should allow for easy modification. This may not be the case if modular laboratories are only designed using prepackaged curriculum. Students must be able to use this equipment to engage in projects that are current, relevant, and forward thinking. Additionally, in order to afford equal opportunities for all students, FCSE classrooms must be accessible to students with disabilities.

**High Speed Telecommunication Systems**

In order for students and teachers to gain experience using a variety of technological tools, all FCSE facilities must include high-speed telecommunication systems with the potential for expansion with new product development. Students must also be able to study and engage in e-commerce and compare it to more traditional forms of consumerism. Students must have access to a wide variety of resources to make connections with people both within and outside of their communities. FCSE facilities must allow students to research their community, state, country, and world and

enable them to draw comparisons. The community must become the extended classroom to provide students with experiences that expand their understanding of cultural, ethnic, and racial diversity. Facilities need to accommodate the application of knowledge through a wide range of instructional practices.

**Proximity to Academic Content Programs**

Placement of FCSE facilities within the school building must promote the interdisciplinary connections essential for students to address family and community issues. Interdisciplinary programs may best be served by sharing a laboratory between two teachers from different content areas or placement of a laboratory with proximity to common content areas. Moreover, students need an understanding of the scientific and technological principles of biotechnology and their impact on individuals. They must have access to science equipment and laboratory spaces. The contextual learning activities in biotechnology require facilities that are designed to apply the science concepts with applications to the study of foods and textiles. In schools, these may include classrooms such as food/nutrition science laboratories or an interdisciplinary laboratory shared by the science and FCSE department. Exposure to these laboratories could also be reinforced at a work site where students are engaged in internships.

**Equipment Representing Industry Standards and Home and Workplace Usage**

FCSE facilities must be flexible to accommodate new equipment that is current, based on industry standards. Where CTE programs are offered, facilities must meet industry standards. FCSE facilities are used by a variety of outside agencies, and attention must be given to sufficient and lockable storage areas, durable cases and universal accessibility (e.g., evening school, day care centers, and community colleges). FCSE facilities also may need to provide the space for interaction with social service agencies providing day care and well-baby clinics while students are in school. Attention also must be given to safety and security requirements. In non-occupational programs, equipment used in the laboratories should duplicate technology used in the home.

## Chapter Summary

Change is the constant of the 21st century, unprecedented and accelerated. As FCSE continues moving toward its vision, changing societal trends, as well as research and technological developments, must be analyzed and addressed. Trends are emerging that present challenges and opportunities to FCSE programs. Many trends impact the content covered in the existing curricula and the methods for delivering instruction. Looking at implications for both curricula and facility design, one is able to envision future room designs that will sustain a flexible program and accommodate future trends. Thus, the facilities recommendations to move away from single purpose classroom spaces to more flexible design models allow FCSE professionals to respond to these trends. FCS educators must share and reshape the activities of the profession within the context of current and future trends.

***"Placement of FCSE facilities within the school building must promote the interdisciplinary connections essential for students to address family and community issues. Interdisciplinary programs may best be served by sharing a laboratory between two teachers from different content areas or placement of a laboratory with proximity to common content areas."***

# Chapter 3

# The Facility Planning Process

## The Process

In planning a new or renovated facility, a school system must translate an educational philosophy into a detailed design. In order to ensure that the facility is well-designed, many points of view and areas of knowledge must be tapped. A planning committee is assembled to bring together individuals with the diverse experience required. The committee will see the project progress through a number of distinct phases from inception to occupancy. Although each project is unique, the following steps outline a typical process:

***Planning***
*Project approval and site selection*
*Planning committee and planning subgroup formation*
*Committee discussions and decisions on program, philosophy, content, staffing, organization, etc.*
*Educational specifications preparation*
*Selection of an architect*

***Design***
*Pre-design meeting with the architect*
*Schematic design*
*Design development*
*Construction documents*

***Construction***
*Bidding and contract award*
*Construction*
*Acceptance of project*

***Occupancy***
*Installation of moveable equipment and furnishings*
*Occupancy*
*Post-occupancy evaluation*

## Planning Committee

Most Family and Consumer Sciences Education projects take place within larger frameworks such as new school construction or major renovation projects. Some projects, however, may be specifically for the renovation or addition of space for FCSE laboratory(ies) and support space. In either case, there will be a planning committee which has a key role in the decision-making process for the overall project.

The planning committee is a collection of people with diverse interests and knowledge in order to provide a sound basis for decisions. Planning committees vary in size and composition, but all planning committees for new construction or major renovation projects should include, at a minimum, the following:

- *School principal*
- *Local maintenance specialist*
- *Local school system facilities planner*
- *Parents*
- *Maryland State Department of Education (MSDE) school facilities specialist*
- *Local educational program specialists including FCSE specialist*
- *Project architect*
- *Teachers*

The local school system administrator ensures that educational programs, budget constraints, and facilities standards are incorporated into the project. The facilities planner and/or the principal is often responsible for chairing the committee and facilitating the process. Even while the project is being developed as a whole entity, each of its programmatic components is studied and developed individually. Development of the FCSE program will be one of these components.

The MSDE school facilities specialist participates in an advisory role. He/she can serve as a resource on national trends, practices across Maryland, and state-level standards and references. The specialist also can serve as a link to MSDE instructional program specialists and other state agencies.

For large or complex projects, additional planning committee members may come from other government agencies, neighboring businesses, community arts groups, or the residential community. The planning committee should be involved throughout the entire process of facilities development although its major impact is in the planning and design phases. Specifically, the committee should participate in the following steps:

1. Preparation of educational specifications.
2. Interpretation of the specifications for the project architect.
3. Development of alternative schematic design concepts.
4. Review of schematic design documents.
5. Review of design development documents.
6. Review of furniture and equipment lists.
7. Post-occupancy evaluation.

Visits to exemplary facilities should be scheduled for committee members.

### Planning Committee Recommendations:

1. *Clearly define the role of the planning committee and responsibilities, and the authority of each person involved in the facilities planning process.*

2. *Clarify the difference between a recommendation and a decision as it relates to the subcommittee's activities and the activities of the planning team as a whole.*

3. *Establish ground rules, priorities, and expectations at the outset.*

4. *Establish a positive climate for the exchange and the expression of individual ideas.*

## Educational Specifications

Educational specifications articulate the physical requirements for the project as an outgrowth of the educational program. They must be consistent with the local educational facilities master plan and the overall project scope, capacity, and budget as approved by state and local agencies. They will guide the architect through the design and construction of the project.

Educational specifications are a text document describing the site development, educational philosophy, and performance expectations for construction projects. They are needed whether the project involves new construction, additions, or renovation and are formally reviewed at the state level. The content of the specifications for projects should include the elements shown in Table 1. Educational specifications for a project solely focused on the FCSE program would be abbreviated including only applicable sections.

The completed educational specifications document is a record of decisions about activities for students, teachers, and administrators. It also is a description of the site development and building spaces required to support such activities. It becomes the basis from which the project architect proceeds with the design. It also serves as a benchmark for checking the progress of the project and the design's responsiveness to the intended programs.

TABLE 1

**Educational Specifications Content**

1. *Project Rationale*
   - *Introduction*
   - *The community*
   - *School board policies*
   - *Belief statements*
   - *Scope of work, budget and schedule*
2. *The Educational Plan*
   - *Curriculum*
   - *Instructional methods*
   - *Staff support*
   - *Technology*
3. *Project Design Factors*
   - *Site Conditions*
   - *Building Systems*
4. *Activity Areas*
   - *General Overview*
   - *Program functions for each education and service program in the project*
5. *Summary of Spacial Relationships*
6. *Summary of Spacial Requirements (Net and gross square feet)*

## Design and Construction

After the educational specifications have been completed and approved, the architect begins to transform the written information into a design for site development and the physical space of the building. In designing a facility, the architect starts with a general, or schematic view of the program and gradually develops a very specific response to the program's requirements. The final design product is a set of instructions for contractors. Each design phase builds on the previous work and reflects a dynamic process of interaction between the architect and the planning committee.

**Pre-Design:** When an architect takes responsibility for the design project, he/she assumes a set of requirements. The foundation of these is the educational specifications, but additional requirements are building codes, safety/environmental regulations, local/state standards and procedures, constraints imposed by funding, and existing conditions. Often a preliminary meeting is held to identify and clarify the project requirements and to interpret the specifications for the consulting architect. The planning committee, the MSDE school facilities specialist, and the architect should be present.

**Schematic Design:** The schematic design phase develops preliminary site and building design solutions, meeting major program goals. Schematic designs are conceptual and derive from requirements set forth in the educational specifications and good architectural and engineering practices. After confirmation of basic relationships, the planning committee and the architect refine the design through a process of review and revision.

The FCSE program specialists on the planning committee should monitor the schematic design closely for proper space development and the overall relationships between the program spaces in the building.

**Design Development:** During the design development phase, the basic elements articulated in the schematic design phase are developed and fine-tuned. The site development components are further detailed: building footprint and individual room dimensions are finalized; fixed furnishings and equipment are located; construction details are begun; utilities and systems are developed and located; and all aspects of the project take on greater depth and sharper focus. The planning committee has an important role at this phase because design

development represents the first opportunity to get into the details of the design and may be the last practical opportunity to make substantial changes in the project.

Cost estimates, energy analyses, and other data are presented during design development. This phase, like schematic design, will be formally reviewed at the local and state levels.

**Construction Documents:** During the construction document phase, the architect produces detailed documents which will form the contract for construction. The primary documents are construction drawings and written specifications. All systems and elements will be fully described including demolition, sitework, structural work, roofing, doors, windows, finishes, equipment, plumbing, heating and cooling, fire protection, lighting, power, and electronic communications. A detailed cost estimate will be prepared. If substantial changes to the design originate outside of the planning committee, they should be brought to the key decision makers of the general committee for evaluation and acceptance.

When the construction documents are complete, they will be reviewed at the local level. Locally approved documents will then be reviewed at the state level. Once approved, the project can be bid for construction.

**Construction:** During the construction of the facility, planning committee involvement is minimal. Significant changes to the project are unusual during construction but do sometimes occur due to unforeseen circumstances. Changes which affect the FCSE program in a substantive way should be brought back to the attention of the appropriate educational and technical staff.

**Installation of Furnishings and Equipment:** Once the construction is substantially complete, furnishings and equipment are installed. All warranties, operating manuals, training, and servicing of new components and systems must be obtained.

**Occupancy and Post-Occupancy Evaluation:** After construction is complete, the staff can move into the facility.

A post-occupancy evaluation can be an invaluable learning tool. Typically, an evaluation team visits the facility in the second year of occupancy. A checklist forms the basis of the evaluation, but there should be provision for comments from users. The facilities planner will use this information to revise local standards. Future planning committees will benefit from the information.

## Interagency Committee on School Construction (IAC) Projects

The State of Maryland provides construction funding to school systems through the Public School Construction Program (PSCP) governed by the IAC. Projects may be funded through the PSCP as part of a new school construction, a renovation, or an addition to an existing school. The PSCP staff and staff from supporting agencies - the Maryland State Department of Education, the Maryland Department of Planning, and the Department of General Services - are available to assist in all phases of project development. Refer to the PSCP Administrative Procedures Guide for more information (Available from the PSCP).

## Locally Funded Projects Requiring Approval by the State Superintendent of Schools

Locally funded school construction projects costing more than $350,000 require the approval of the State Superintendent of Schools. A MSDE School Facilities Specialist participates in all phases of planning and design and coordinates the State review and approval for the following submissions:

*Educational Specifications*
*Schematic Design*
*Contract Award*
*Design Development*
*Construction Documents*
*Change Orders Over $25,000*

Refer to Code of Maryland Regulations (COMAR) 13A.01.02.03 for requirements.


*Einstein High School*
*Montgomery County Public Schools*

# Chapter 4

# Facilities Design for Family and Consumer Sciences Education

## Design Concepts

***Strong curricular and facilities relationships with other educational programs are a critical part of planning for successful family and consumer sciences education (FCSE) programs.***

FCSE programs teach a wide range of subjects stressing active, hands-on experiences in addition to text book and lecture methods of instruction. While FCSE programs have a unique core of focus and need team planning, FCSE programs also overlap with and relate to other educational programs (e.g., business education, art, science, social studies, math, health, language arts, and technology education). These interdisciplinary relationships strengthen cross-curriculum planning and support an integrated delivery of instruction. These relationships maximize the ability of FCSE staff and students to access instructional and facility resources and to achieve the most effective program and efficient use of facilities.

***The wide range of content that is integrated within the FCSE program and the number of fulltime FCSE staff typically found in Maryland schools often requires the use of a multipurpose laboratory to reach program outcomes.***

The term multipurpose laboratory suggests a commitment to variety in space layout, equipment, casework, and utilities to support an array of clearly defined activities. The multipurpose laboratory accommodates activities related to food and nutrition; individual, child, and family development; consumer issues; and family resource management. Ample storage rooms and casework are critical for the success of the multipurpose laboratory.

***With a changing society, the emphasis of FCSE has shifted away from the making of products for the family such as foods and clothing.***

Rather than solely emphasizing the study of food preparation from basic ingredients, students also study food consumption. In middle schools, and particularly in high schools, more emphasis is placed on food science including the chemistry of foods and less emphasis on the preparation of foods. Students learn to utilize the food guide pyramid and dietary guidelines to evaluate eating habits and plan menus. Students analyze the relationships among diet, lifestyle, heredity, and health. While food preparation remains a part of the FCSE program, the equipment and time used for food preparation has changed. The study of textiles has transformed from an emphasis on sewing skills to a focus on consumption with students investigating topics such as fashion, fabric care, clothes repair, fibers, labeling, and the socio-psychological aspects of dress. The study of textiles does not require a separate laboratory. The study of textiles should be integrated into topics such as family resource management and consumer education. Textiles can be studied among other topics in a multipurpose laboratory or in a general design laboratory with a focus on several areas of design such as fashion, interior, and graphic design.

***Modular computer laboratories are marketed for FCSE programs that include pre-packaged curriculum, workstations, hardware, and software. For FCSE programs staffed with one fulltime teacher, it is inappropriate to design the laboratory solely for this type of installation and method of instruction. For FCSE programs staffed with two or more fulltime teachers, one lab can be designed as a modular computer laboratory if the FCSE content areas are not taught solely using this instructional method.***

Modular computer laboratories can be expensive, and may not respond well to changes in curriculum over time. Modular computer laboratories should provide for instructor-developed curriculum with the flexibility to adapt new and emerging program trends. Lab arrangements must provide for hands-on experiences and cross-curriculum planning. Purchasing select software and associated instructional materials without the casework and hardware can be an approach to using pre-packaged software as one of many instructional methods for the FCSE program.

***Telecommunications systems for data (computer network), voice (telephone), and video are an important aspect of the FCSE program.***

Telecommunications systems are important instructional and communications tools. Students must have access to resources both within and outside their communities. A computer network is critical as a tool for instruction but should not be used as the primary method of instruction. Data outlets and the corresponding hardware and software should be related to student and teacher workstations as opposed to being placed at a centralized location in the laboratory. A telephone outlet should be in proximity to the teacher station. One or more video outlets should be located for viewing a monitor from the student workstations.

***The layout for the FCSE laboratories must include a minimum of one student station per laboratory accessible to persons with disabilities.***

Title II of the Americans with Disabilities Act (ADA) requires public school projects to comply with either the Uniform Federal Accessibility Standards (UFAS) or the ADA Accessibility Guidelines (ADAAG). The Maryland Accessibility Code (COMAR.05.02.02) also is required for public school projects. The work surface height should be no more than 34 inches and provide appropriate clearances per ADAAG 4.32. All utilities at the workstation should be in reach per ADAAG 4.2.

***The ability of the teacher to visually supervise students is critical to achieving instructional goals and for maintaining a safe learning environment.***

Unimpeded visual supervision across all areas of the laboratory space and between the laboratory and adjacent support spaces is important. Students are often involved in activities such as science experiments and food preparation that have the potential for causing injury. In child development programs, students are working with very young children where safety always is an important consideration. Teacher supervision is paramount in maintaining a safe environment. A teacher's assessment of student learning among simultaneous individual and group activities is also aided by good visual supervision.

***When a school is staffed with more than one fulltime FCSE teacher, the ability of teachers to plan and relate as a discipline is important and, in part, tied to the proximity of FCSE facilities.***

This need must be balanced with the importance of the interdisciplinary relationships previously mentioned. These often-opposing goals will have to be reconciled and balanced in each school construction project.

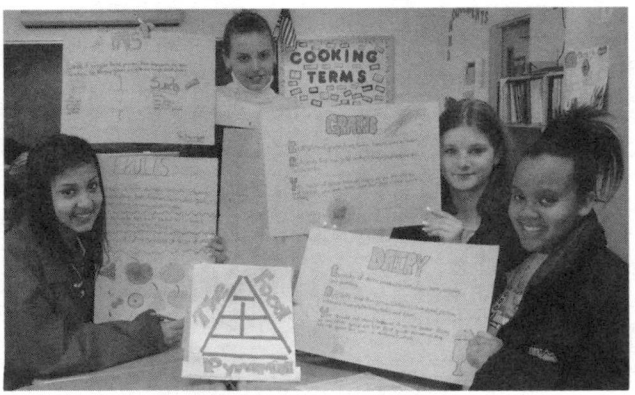
## Middle and High School Facilities

The FCSE program will have a strong curriculum and facility relationship with one or more educational programs such as art, math, language arts, science, business education, health, social studies, or technology education. These relationships will determine the location of the FCSE laboratory(ies) and influence the location of the FCSE teacher planning space. The FCSE teacher planning area should not be isolated but merged with the teacher planning space of other appropriate program(s).

For middle schools with one fulltime FCSE teacher, one multipurpose laboratory will serve the entire FCSE program. In middle schools with two fulltime FCSE teachers, two multipurpose labs can be provided or one for food/nutrition science and a second general lab.

For high schools with one fulltime FCSE teacher, one multipurpose laboratory will serve the entire FCSE program. In high schools that have two or more fulltime FCSE teachers, two or more of the following laboratories should be selected: multipurpose, general, food/nutrition science, child development, or interdisciplinary.

High school FCSE programs may provide, in addition to introductory and exploratory courses, advanced courses for students enrolled in approved career and technology education (CTE) programs. Access to specialized facilities and equipment may be provided through work experiences with business partners and/or through in-school facilities.




*Esperanza Middle School*
*St. Mary's County Public Schools*

## Middle School Multipurpose Laboratory

***Activities:***

The multipurpose laboratory must support a variety of activities and teaching methods. Activities include lectures, demonstrations, experiments, individual and group projects, small group and class discussions, and individual or group research.

Experimentation, group projects, and observation require student workstations with each station serving a maximum of four students, and with sufficient work surface for a variety of materials and equipment. A sufficient number of workstations should be provided to allow all students to engage in one activity simultaneously. Student workstations can be fixed or movable; however, outlets for electricity, data, and water must be located at each station. Work surface or counter space must be available for projects that occur over a long period of time (days, weeks, or months). At least one area in the laboratory should be designated for long-term projects and include access to water, electricity, and data outlets. A demonstration station should be provided at one end of the laboratory for teacher use.

***Users:***

Teacher: 1

Students: 28 Maximum

The layout of the multipurpose laboratory must not accommodate more than 28 students. The number of students in a laboratory has a direct influence on the safety of the lab as well as the quality of the educational experiences. No more than 28 students should be assigned to the laboratory space.

***Space:***

The multipurpose laboratory must have two distinct areas. One area should be equipped with student workstations, and the second area should accommodate lectures, discussions, demonstrations, and activities involving materials that should not be used at the student workstations because of the potential for contaminating foods. Provide a minimum of 36 square feet per student for the student workstation portion, and a minimum of 18 square feet for the lecture/discussion/ demonstration/activity portion for a total of 1,512 square feet to accommodate 28 students.

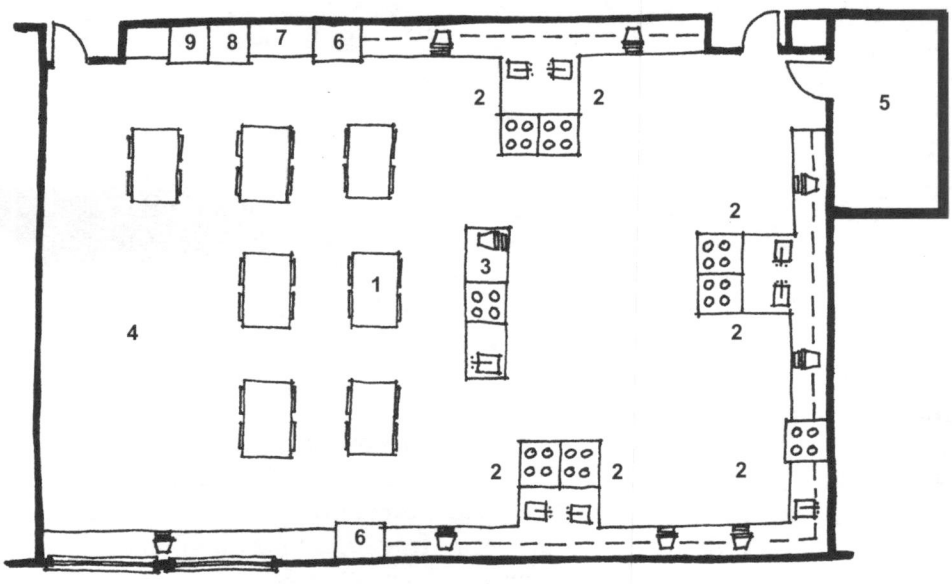
If one multipurpose lab serves the entire FCSE program, provide a minimum of 125 square feet for a general storage room. If two multipurpose laboratories serve the FCSE program, provide a minimum of 250 total square feet for one shared or two separate storage rooms. Additional storage should be provided in base and wall cabinets within the lab. The storage room(s) and some cabinets will require locks for the security of instructional materials and equipment.

The ceiling height should be a minimum of 9'-6", to allow for good visibility of audio-visual presentations.

This lab should be located with proximity to parking and with an exterior door to facilitate the weekly delivery of supplies.

***Utilities:***

**Electrical** - A minimum of one outlet per student should be provided at the student workstations (14 duplex outlets for 28 students). These outlets should be provided with an emergency shut-off capability. The teacher demonstration station should have a minimum of two duplex outlets. The emergency electrical service shut-off control should be located at or in proximity to the teacher demonstration station. Electrical system requirements must follow the 1999 (or latest addition) of *Maryland Public School Standards for Telecommunications Distribution Systems,* published by the Maryland State Department of Education. A minimum of one duplex outlet must be provided for, and within six feet of, each data outlet. In addition to general purpose outlets, the electrical power for computer workstations must be on dedicated circuits using one circuit for each four duplex outlets.




1. **Movable Table**
2. **Workstation**
3. **Demonstration**
4. **Long-Term Project**
5. **Storage**
6. **Refrigerator/Freezer**
7. **Display Case**
8. **Dryer**
9. **Washer**

**MIDDLE SCHOOL MULTIPURPOSE LAB**

**Data** - A minimum of one data outlet must be provided for each student workstation but no less than one data outlet for every four students. A minimum of one data outlet must be provided for the teacher/demonstration workstation. Provide two network outlets for additional devices (e.g., printer).

**Fire Safety** - Local codes may require a fire protection system above cook-top equipment.

**Video** - A minimum of one video outlet must be provided. Two video outlets may be needed to provide all students with acceptable visibility.

**Voice** - A minimum of one telephone outlet must be provided.

**Plumbing** - A minimum of one sink at each student workstation, but no less than one sink for every four students, should be provided. Provide one sink at the demonstration station. One large utility sink with cold and hot water should be located in the laboratory area. A safety eyewash should be provided.

***Furnishings and Equipment:***

The primary element of the multipurpose laboratory is the student workstation. Typically each station is laid out to support four students. A minimum of 3 linear feet of work surface should be provided per student. The workstations can be fixed or movable; however, fixed stations are preferred since utilities and equipment can be built into the station and not limited to the perimeter of the room. Fixed stations lead to better layouts and easy access to utilities and equipment for all students at the workstation.

Each student workstation should include a sink, an oven, and a four-burner cook-top. Ovens should be self-cleaning, and cook-tops should be the sealed type. A minimum of two residential refrigerators/freezers and two dishwashers should be distributed in the lab for easy access. A washer and dryer should be provided in or adjacent to the laboratory. If the washer and dryer will be used during instructional activities, it should be located to control noise. One alternative is to combine the washer/dryer and storage requirements into one room. Microwave ovens should be located and fixed under a wall cabinet at each workstation. This location avoids using valuable counter space. Sewing machines, if provided, should be portable equipment and placed in storage for use as needed.

Some counter surface should be provided adjacent to the washer and dryer. Perimeter counters should have a minimum depth of 24 inches, 30 inches is desirable in some areas. Counters at student workstations should be seamless to ensure long term sanitary conditions.

The demonstration station should be equipped with an oven, cook-top, and a video camera to be viewed on a TV monitor(s).

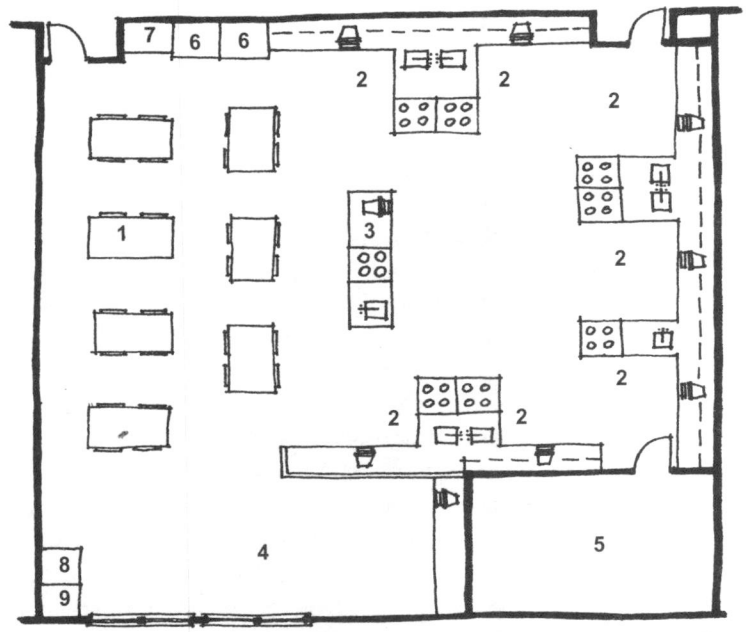
Fire extinguishers and blankets should be located for easy access.

## High School Multipurpose Laboratory

The multipurpose lab at the high school has the same specifications as the multipurpose lab at the middle school with the following additions:

- If the multipurpose laboratory supports the entire FCSE program, provide a minimum of 38 square feet per student for the student workstation portion, and a minimum of 20 square feet for the lecture/discussion/ demonstration portion, for a total of 1,624 square feet to accommodate 28 students.
- If the multipurpose lab serves the entire FCSE program, provide a minimum of 150 square feet for a general storage room.
- If the multipurpose laboratory serves food/ nutrition science, a minimum of one sizeable commercial refrigerator and one sizeable commercial freezer should be placed in the lab for easy access.

1. Movable Table
2. Workstation
3. Demonstration
4. Long-Term Project
5. Storage
6. Refrigerator/Freezer
7. Display Case
8. Dryer
9. Washer




**HIGH SCHOOL MULTIPURPOSE LAB**

- If the multipurpose laboratory also serves advanced courses for an approved CTE program, access to specialized facilities will be required through business partnership and/or adding to the space requirements for the lab. Since these requirements can take many directions, it is beyond the scope of this guide to define these additional requirements.

- One gas cock may be provided for every two students and one gas cock at the teacher demonstration station. If gas is provided, an emergency gas service shut-off control should be located at or in proximity to the teacher demonstration station.

- Provide a workstation with an exhaust hood and provide an emergency eyewash.

## General Laboratory

***Activities:***

The general laboratory is an option at a middle or high school with two or more fulltime FCSE teachers and does not serve food/nutrition science activities.

The general laboratory must support a variety of activities and teaching methods. Activities include lectures, demonstrations, individual and group projects, small group and class discussions, and individual or group research.

Activities require student workstations serving a maximum of four students for every one station with sufficient work surface for a variety of materials and equipment. Student workstations should be movable; however, they should be easily moved to a location adjacent to outlets for electricity and data. Work surface or counter space must be available for projects that occur over a long period of time (days, weeks, or months). At least one area in the laboratory should be designated for long term projects and include access to electricity and data outlets.

***Users:***

Teachers: 1

Students: 28 Maximum

The layout of the general laboratory should be planned to accommodate no more than 28 students. The number of students in a laboratory has a direct influence on the quality of the educational experiences.

***Space:***

The general laboratory may be planned as one instructional area or have two distinct instructional areas - one area equipped with student workstations and the second area to accommodate lectures, discussions, and other activities. Provide a minimum of 36 square feet per student for the student workstation portion if a lecture/discussion area is also provided. Provide a minimum of 38 square feet per student if a lecture/discussion area is not provided. The lecture and discussion area, if provided, should be a minimum of 14 square feet per student. The lab without a lecture/discussion area should be a minimum of 1,064 square feet to accommodate 28 students. With a lecture/discussion area, the lab should be a minimum of 1,400 square feet to accommodate 28 students.

Provide a minimum of 100 square feet for a storage room. Additional storage should be provided in base and wall cabinets within the lab. The storage room and some cabinets will require locks for the security of instructional materials and equipment.

The ceiling height should be a minimum of 9'-6" to allow for good visibility of audio-visual presentations.

***Utilities:***

**Electrical** - A minimum of one outlet per student should be provided at the student workstations (14 duplex outlets for 28 students). These outlets should be provided with an emergency shut-off capability. Electrical system requirements must follow the 1999 (or latest addition) of *Maryland Public School Standards for Telecommunications Distribution Systems,* published by the Maryland State Department of Education.

One duplex outlet must be provided for and within six feet of each data outlet. The electrical power for computer workstations must be on dedicated circuits, using one circuit for each four duplex outlets.

**Data** - A minimum of one data outlet must be provided for each student workstation but no less than one data outlet for every four students. A minimum of one data outlet must be provided for the teacher workstation. Provide two network outlets for additional devices (e.g., printer).

**Video** - A minimum of one video outlet must be provided.

**Voice** - A minimum of one telephone outlet must be provided.

**Plumbing** - A minimum of two standard-sized sinks plus one large utility sink with cold and hot water should be located in the laboratory area.

***Furnishings and Equipment:***

The primary element of the general laboratory is the student workstation. Typically tables are laid out to support four students per workstation. A minimum of 3 linear feet of work surface should be provided per student.

Perimeter counters should have a minimum depth of 24 inches, 30 inches is desirable in some areas, and a height which allows the student tables to be moved adjacent to the counter.

## Food/Nutrition Science Laboratory

***Activities:***

The food/nutrition science laboratory supports a variety of activities and teaching methods. Activities include lectures, demonstrations, experiments, individual and group projects, small group and class discussions, and individual or group research.

Experimentation, group projects, and observation require student workstations, usually one for every four students with sufficient work surface for a variety of materials and equipment. Student workstations can be fixed or movable; however, outlets for electricity, data, and water must be located at each station. A demonstration station should be provided at one end of the laboratory for teacher use. In the high school lab outlets for gas may be provided at the demonstration and student work stations.

***Users:***

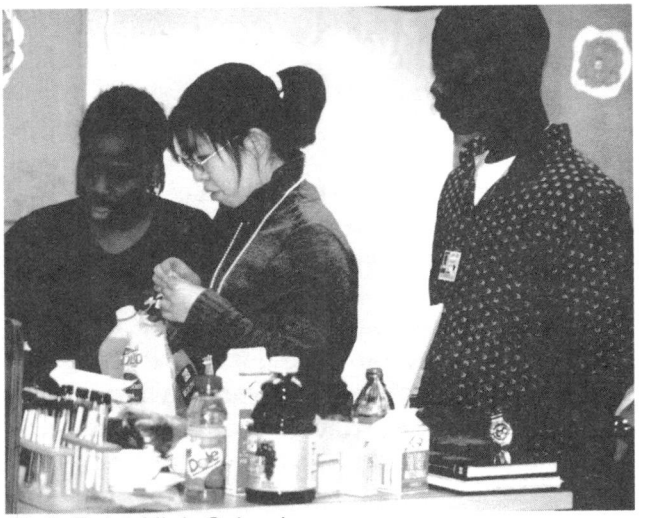
Teachers: 1

Students: 28 Maximum

The layout of the food/nutrition science laboratory must not accommodate more than 28 students. The number of students in a laboratory has a direct influence on the safety of the lab as well as the quality of the educational experiences. No more than twenty-eight students should be assigned to the laboratory space.

***Space:***

The food/nutrition science laboratory must be designed to have two distinct areas. One area is equipped with student workstations, and the second area accommodates lectures, discussions, and demonstrations. Provide a minimum of 36 square feet per student for the student workstation portion of the laboratory,



*High Point High School*
*Prince George's County Public Schools*

and a minimum of 18 square feet per student for the lecture, discussion, and demonstration portion, for a total of 1,512 square feet to accommodate 28 students.

Provide a minimum of 125 square feet for a general storage room. Additional storage should be provided in base and wall cabinets within the lab.

The ceiling height should be a minimum of 9'-6", to allow for good visibility of audio-visual presentations.

This lab should be located with proximity to parking and with an exterior door to facilitate the weekly delivery of supplies.

***Utilities:***

**Electrical** - Provide a minimum of one outlet per student located at the student workstation (14 duplex outlets for 28 students). These outlets should be provided with an emergency shut-off capability. The demonstration station should have a minimum of two duplex outlets. The emergency electrical service shut-off control should be located at or in proximity to the teacher demonstration station. Electrical system requirements must follow the 1999 (or

latest addition) of *Maryland Public School Standards for Telecommunications Distribution Systems,* published by the Maryland State Department of Education. A minimum of one duplex outlet must be provided for and within six feet of each data outlet. The electrical power for computer workstations must be on dedicated circuits, using one circuit for each four duplex outlets.

**Data** - A minimum of one data outlet must be provided for each student workstation but no less than one data outlet for every four students. A minimum of one data outlet must be provided for the teacher/demonstration workstation. Provide two network outlets for additional devices (e.g., printer).

**Ventilation** - Provide an exhaust hood above oven and cook-top equipment. In high schools, provide an exhaust hood workstation to accommodate science activities.

**Fire Safety** - Local codes may require a fire protection system above cook-top equipment.

**Video** - A minimum of one video outlet must be provided.

**Voice** - A minimum of one telephone outlet must be provided.

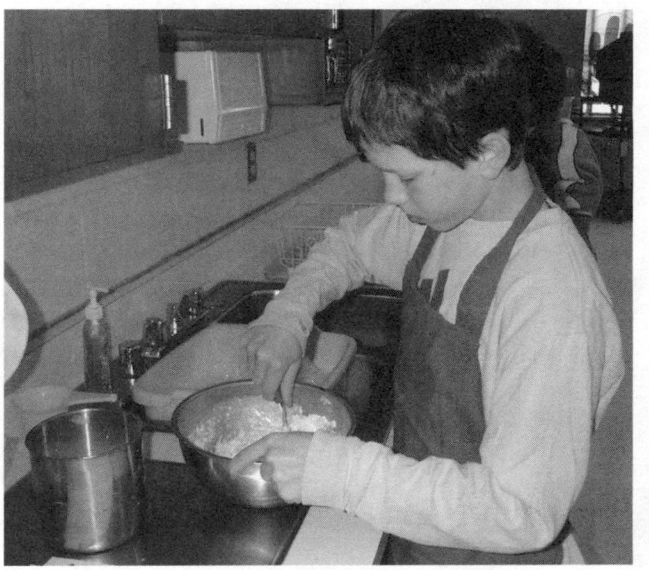
**Plumbing** - A minimum of one sink at each student workstation but no less than one sink for every four students should be provided. Provide one sink at the demonstration station. One large utility sink with cold and hot water should be located in the laboratory area. Provide an emergency eyewash station.

**Gas** - One gas cock may be provided at the high school level for every two students and one gas cock at the teacher demonstration station. If gas is provided, an emergency gas service shut-off control should be located at or in proximity to the teacher demonstration station.

***Furnishings and Equipment:***

The primary element of the laboratory is the student workstation. Typically each station is laid out to support four students. A minimum of 3 linear feet of lab work surface should be provided per student. The workstations can be fixed or movable; however, fixed stations are preferred since utilities and equipment can be built into the station and not solely placed at the perimeter of the room. Fixed stations lead to better layouts and easy access to utilities and equipment for all students at the workstation.

Each station should include a sink, oven, microwave oven and a four-burner cook-top. Ovens should be self-cleaning and cook-tops should be the sealed type. A minimum of one sizeable commercial refrigerator, one sizeable commercial freezer, and two dishwashers should be distributed in the lab for easy access. A washer and dryer should be located in, or adjacent to, the laboratory. Microwave ovens may be portable equipment, and placed in storage for use as needed or located permanently on the underside of wall cabinets. Individual student tote tray storage in cabinets is desirable to house student project materials.



*Hereford Middle School*
*Baltimore County Public Schools*

Some counter surface should be provided adjacent to the washer and dryer. Perimeter counters should have a minimum depth of 24 inches, 30 inches is desirable in some areas. Counters at student workstations should be seamless to ensure long term sanitary conditions.

The demonstration station should be equipped with an oven, cook-top, and a video camera to be viewed on a TV monitor(s).

Fire extinguishers and blankets should be located for easy access.

## Child Development Laboratory

If a childcare center is planned, the child development laboratory must meet the licensure requirements under COMAR 07.04.02 administered by the Maryland Department of Human Resources (DHR). Meeting licensure requirements will allow for partnerships with private childcare providers, Head Start, and child care services for staff or students.

***Activities:***

Activities include lectures, demonstrations, individual and group projects, small group and class discussions, and individual or group research. Students guide and direct children in learning, play, motor skills, music, and art activities. Students select, prepare and serve nutritious snacks. Students study, observe, and evaluate child development.

***Users:***

Teacher: 1

Students: 28 Maximum

Children: 6 - 15

***Space:***

The child development lab will, at a minimum, require a laboratory area, classroom, lavatories, storage, and outdoor play area. The Maryland Department of Human Resources requires a minimum of 35 square feet per child not including additional space required for a food preparation area, lavatories, and storage units or room.

The minimum space requirement for a lab serving up to 15 children including food preparation, lavatories, and storage units is 1,000 square feet. A classroom for students should be provided at a minimum of 750 square feet. Provide a minimum of 75 square feet for a general storage room and 75 square feet for an outdoor storage room. An outdoor play area is required by DHR. Direct access should be provided from the lab to the outdoor play area. The outdoor play area should be easily supervised visually from within the lab. It should be a fenced or walled enclosure for safety reasons.

An observation room for students to visually and audibly observe children is optional. If desired, observation space should be provided within the classroom space adjacent to the child development lab. A minimum of 10 sq. ft. for work surface and seating per student is needed in addition to the space requirements discussed above. Many teachers prefer student observation to take place in the child development lab. This provides for improved student observation and teacher supervision of students.

The child development lab should be located at the level of exit discharge according to code requirements. The child development lab must not be greater than one-half story above or below the level of exit discharge. Any area used for napping must have smoke detectors even if the building has a sprinkler system.

The teacher must be able to visually supervise all areas from almost any location.

The child development lab should be in proximity to visitor parking to facilitate the drop-off and pick-up of children.

***Utilities:***

**Electrical** - In the lab and classroom, provide a minimum of one duplex outlet every six to eight linear feet of wall surface. In addition, electrical system requirements must follow the 1999 (or latest addition) of *Maryland Public School Standards for Telecommunications Distribution Systems,* published by the Maryland State Department of Education. A minimum of one duplex outlet must be provided for and within six feet of each data outlet. The electrical power for computer workstations must be on dedicated circuits, using one circuit for each four duplex outlets.

**Data** - In the lab and classroom, provide a minimum of three student outlets, one teacher outlet, and one outlet for an additional device (e.g., printer).

**Video** - In the lab and classroom, provide a minimum of one video outlet.

**Voice** - In the lab and classroom, provide a minimum of one telephone outlet.

**Plumbing** - Provide two sinks at adult height, one in the lab and one in the food preparation area, and one sink and drinking fountain at child height. The adult sink in the lab should be sufficiently sized to clean large objects. The lab must include lavatories for children.

***Furnishings and Equipment:***

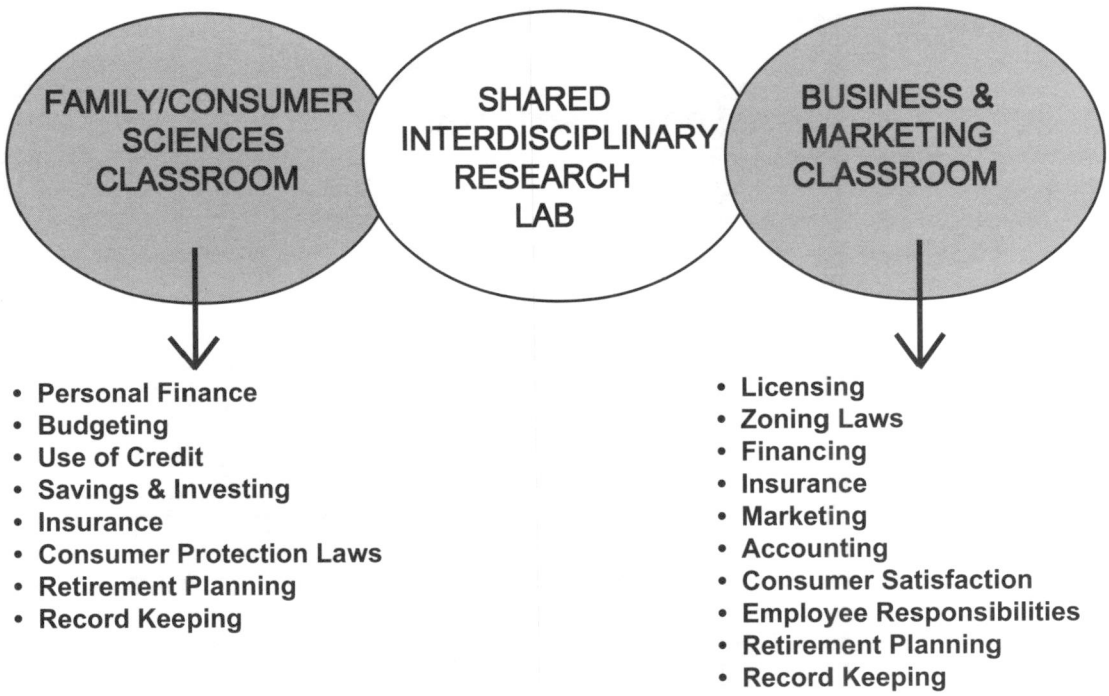
The lab should be equipped with tables and chairs for young children; chairs for students; various play/motor equipment and instructional materials; storage units to accommodate children's coats, hats, boots, and other personal items; and child height shelving for books and other materials.

Provide a residential refrigerator/freezer, sink, microwave oven, small stove, and dishwasher for food preparation. A washer and dryer should be provided with some adjacent counter space. The classroom should be equipped with student desks and chairs, and a teacher workstation and chair. Individual student tote tray storage in cabinets is desirable to house student teaching materials. In the lab provide tack boards similar to the square footage provided in preK and kindergarten classrooms.

*Loch Raven High School*
*Baltimore County Public Schools*

## INTERDISCIPLINARY LAB:

**Example 1:**




## Interdisciplinary Laboratory

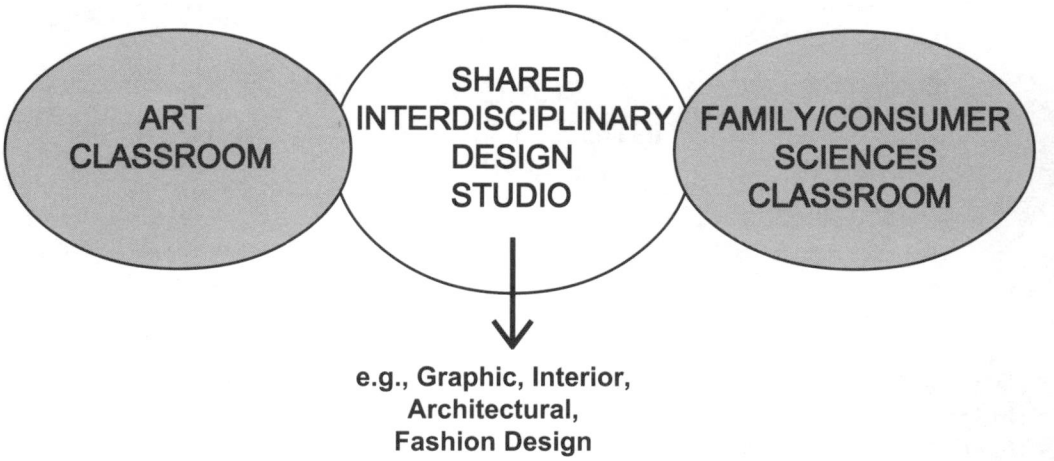
Interdisciplinary programs are often best served by sharing a laboratory between two fulltime teachers, one from each discipline. One general classroom space can be provided for each fulltime teacher with an adjacent, shared laboratory.

Teacher staffing patterns may suggest that one laboratory be provided to serve an interdisciplinary team of teachers. At times, the number of students projected to take courses in a discipline creates the need for a specific number of teaching stations plus a fraction of a teaching station. When this occurs in two disciplines that practice cross-curriculum planning, there may be an opportunity to enhance the utilization of teachers and space by providing an interdisciplinary laboratory serving the FCSE program and another discipline.

Opportunities for interdisciplinary laboratories are many. A science/food & nutrition science laboratory can serve the science and FCSE programs. A design and marketing laboratory can serve the art and FCSE programs with a focus on design subjects such as graphic, interior, architectural, and fashion (See Diagram on Page 32). A laboratory for the study of personal finance, entrepreneurship, marketing, and consumer issues can serve the business education and FCSE programs (See Diagram Above). A health and fitness laboratory can serve the physical education and FCSE programs with an emphasis on human development, nutrition, personal fitness, and exercise physiology.

## INTERDISCIPLINARY LAB:

**Example 2:**




### Student Project Work Room

A student project work room serves groups of students working on projects that require a quiet area and/or the need to setup a long-term project in a secure space. Providing a project room relieves the laboratory from having a long-term student project area. The square footage of the room will depend on the number of students to be served and the work surface required for long-term projects. The space should be primarily furnished with tables and chairs that can easily be arranged to suit a variety of needs. Casework should be limited. The room should be equipped with the same utilities provided in the lab such as water, electricity, and data. Visual supervision by the teacher from the laboratory into the student project work room is required.

### Teacher Planning

Provide a minimum of 60 sq. ft. per teacher, usually within a teacher planning space shared with one or more other educational programs. Teacher planning space should provide each staff member an ample work surface and storage for personal items and office supplies. If teacher planning is decentralized with each teacher planning in their assigned lab, then ample meeting space should be provided for groups of teachers to have joint planning activities.

## General Design Considerations

### Circulation and Egress

The arrangement of fixed and movable furnishings needs to allow teachers and students to circulate easily through the space. Good circulation aids student activities and provides a safer instructional area. Fixed and movable furniture and equipment should be evaluated at the schematic design layout phase to study the adequacy of circulation space.

All labs should have two doors leading to a corridor or other means of egress. Exit doors should be located away from casework and other fixed elements to permit a quick exit in case of an emergency.

Storage rooms, student project rooms, and other support spaces should be located to maximize good access and security. The teacher should be able to monitor student access to these spaces without difficulty.

### Accessibility for Persons with Disabilities

Public schools must provide access for students with disabilities to all educational programs in the least restrictive manner. Public school systems may not discriminate against for

individuals in matters of employment and public services. FCSE facilities must be accessible to students, teachers, and public users.

Title II of the Americans with Disabilities Act (ADA) requires that public schools comply with either the Uniform Federal Accessibility Standards (UFAS) or the ADA Accessibility Guidelines (ADAAG). The Maryland Accessibility Code (COMAR.05.02.02) is also required for public schools. The work surface height should be no more than 34 inches and provide appropriate clearances per ADAAG 4.32. All utilities at the workstation should be in reach per ADAAG 4.2.

Accessible student workstations should be integrated fully into the classroom rather than isolated away from the area of student workstations. An accessible workstation serving students with and without disabilities is the most effective way to insure equal opportunities for student participation. Clearances between workstations and other furniture and equipment must meet ADA requirements. Adjustable seat, table, and display surfaces are desirable.

For facilities in child development labs accessible to children, refer to the ADAAG Guidelines for building elements designed for children's use.

## Safety

Safety is fundamental to a successful FCSE program. While lab design can not guarantee a safe environment, consideration of essential design features becomes an important element of a safety program.

Class size has a direct influence on safety. Specifications for most of the laboratories in this chapter state that the laboratory must not be planned for more than 28 students. Many educators recommend a limit of 24 students. The standard of 28 students balances the importance of safety, instructional quality, and budget considerations for staffing and facilities. The corollary is that the number of students assigned to a lab should not exceed the number for which it was designed.

The ability of the teacher to visually supervise students is another critical safety consideration. Good vision lines across the laboratory and between the lab and support spaces are important. Student project rooms or adjacent classrooms can be designed with ample glazing to accomplish this goal.

An adequate ventilation system is important to control odors and particularly to exhaust potential contaminants from food/nutrition science experiments. Exhaust hoods should be provided for food/nutrition science and multipurpose labs. See a more detailed discussion of ventilation on page 34.

Electrical and gas (if used) utilities serving the student workstations and the teacher demonstration areas should be fitted with emergency shut-off controls. The location should balance the need for easy access by the teacher and to avoid nuisance use by students. The computer network should not be on the same circuit as the general use lab outlets and not subject to the same emergency control.

Eye protection safety goggles will be necessary in labs that include science experiments. A sanitary eye goggle cabinet will need to be specified with appropriate electrical power.

Fire extinguishers and blankets should be easily accessible to the food/nutrition science and multipurpose laboratories.

## Presentation and Display

Active presentation and passive display are essential media for transmitting information.

Accommodating successful presentations requires careful attention to viewing distance, angle of view, and lighting. Acceptable viewing distance is a function of the size of the object being viewed and the level of detail acceptable

for educational intent. Small images can be enhanced through enlargement and projection. The use of video monitors has to be thoughtfully considered. A good guideline is the monitor size (diagonal dimension in inches) equals the maximum viewing distance in feet. In some labs, multiple monitors, larger monitors, or video projection may be required.

Viewing angle can involve live demonstrations, video monitors, or video projections. Students should not view "flat screen" formats such as video monitors from an angle greater than 45 degrees.

Spot lighting for demonstration tables will illuminate details. Spot lighting should be controlled at the demonstration table. Many types of video presentations will require a darkened room. Blinds or shades will be necessary in all labs.

Display of two-dimensional materials remains an important function in the FCSE program. Ample marker board and tack board serve as the basis for two-dimensional display. The average lab requires a minimum of 16 linear feet of marker board. A marker board can sometimes serve double duty as a projection screen. A minimum of 8 linear feet of tack board is required.

Three-dimensional displays should be provided and can take the form of lockable display cases for long-term visual-only displays. One display case per classroom is ideal; however, budget constraints and available wall space may compromise this goal. A minimum of one lighted display case for every two classrooms is essential. These cases will serve to highlight the FCSE program to FCSE students, the wider school audience, parents, and others.

## Finishes

Several types of flooring are appropriate for laboratories and support areas including but not limited to vinyl composition tile, sheet vinyl, and epoxy. Many facility managers find vinyl tile to be cost-effective and durable.

Walls in FCSE labs should be durable and easily cleaned. Glazed unit masonry, ceramic tile, or medium-gloss paint over many substrates can be satisfactory. Sufficient tack strips and tack board are important to minimize damage to walls due to taping and tacking.

Ceilings are typically finished with standard acoustical ceiling tile. These ceiling systems provide good sound absorption, are cost effective, and provide flexibility for the distribution of electrical and mechanical systems. In labs with cooking activities, acoustical ceiling tile should be less absorptive and have a washable surface.

## Heating, Ventilating, and Air Conditioning (HVAC)

An adequate HVAC system is a prerequisite for a safe and comfortable learning environment. Some FCSE laboratories support activities beyond those of standard classrooms that place additional demands on the HVAC system. Some FCSE activities introduce strong odors while other activities are sources of contaminants that potentially could impact on student comfort or health.

Food/nutrition science, multipurpose, and some interdisciplinary labs will require a minimum of 20 cubic feet per minute (cfm) of outside air per person in accordance with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 62. Child development and general labs will require a minimum of 15 cfm of outside air per person. To prevent objectionable odors from entering other spaces, air from food/nutrition science, multipurpose, and some interdisciplinary labs should not be recirculated into other spaces. These labs should be under negative pressure when the exhaust system(s) is in use. This requires the volume of air exhausted from the lab to be greater than the volume of air supplied to the lab under all operating circumstances.

Labs serving food/nutrition science must be equipped with exhaust hoods at each student workstation and the demonstration table for controlling odors and exposure to potentially toxic materials from experiments. Exhaust hoods should be located to avoid supply air velocities greater than 50 fpm in proximity to the hood, away from circulation patterns that could cause turbulence near the hood, and to allow a group of students to gather around when the hood is used for demonstrations. Clothes dryers must be properly exhausted.

The relative indoor comfort of people is determined by air temperature, radiant temperature of surrounding surfaces, uniformity of air temperature throughout a room, relative humidity, and air movement. In FCSE facilities involving food/nutrition science, the relative humidity may have a greater potential for exceeding comfort levels due to food preparation, the storage of food materials, and the use of sinks, dishwashers and clothes washers and dryers. The selection of the HVAC system for this circumstance should insure that the relative humidity is generally maintained in the range of 30%-60%.

Good speech communication is essential for an effective learning environment. Noise from components of the HVAC system can be disruptive. The ASHRAE recommends a criterion for classroom sound of NC-30 as an acceptable noise level.

## Lighting

The lighting requirements for FCSE facilities are similar to general classroom requirements with some specialized characteristics worthy of discussion. Lighting levels should be 75 footcandles for general class work and up to 100 footcandles for detailed work. Parabolic louvers or other strategies should be considered to minimize glare on computer screens. Control of lighting by quadrants of the room may be useful as in the case of darkening the area of video projection while allowing full lighting at the students work surfaces.

Task lighting should be specified for demonstration tables. Shades should be available to exclude daylight when necessary. Ample lighting is required in storage rooms to easily identify items and to safely move materials.

## Outdoor Educational Resources

Gardens are an excellent resource for the FCSE program as well as for other programs such as math, science, social studies, and language arts. Gardens can include a portion devoted to native and/or exotic herbs and provide hands-on learning experiences for the students in food/nutrition science programs. Gardens can also be a valuable resource to support a child development program. The garden area should be within easy access from the FCSE laboratory and requires good light, access to water, and protection from foot traffic, physical education activities and other potential sources of damage. Courtyards are prime locations as they can provide security. If not located in a courtyard, then fencing may be appropriate. Gardens should be constructed of materials that clearly indicate it to be a permanent part of the school design.

An outdoor playground for the child development laboratory is an important design feature and should be directly accessible from the lab. If the child development lab includes a licensed childcare center, regulations of the Maryland Department of Human Resources require a playground.

## Telecommunications Distribution Systems

Telecommunications distribution systems for data, voice, and video are an important component of the FCSE program. FCSE facilities must comply with the MSDE *Maryland Public School Standards for Telecommunications Distribution Systems* (1999, or the latest issue).

Laboratories must provide one data outlet for each student group workstation but not less than one outlet for every four students. One data outlet must be provided for the teacher workstation and two outlets for additional network devices (e.g., printer). Each laboratory must also have one telephone and one video outlet. General classrooms must have one data outlet for the teacher workstation, three student data outlets, and one additional network device data outlet. Classrooms must provide one telephone outlet and one video outlet. Teacher planning space must have one data and one telephone outlet for each workstation.

The minimum standard for horizontal cable is Enhanced Category 5 UTP for data and telephone, and RG-6/u Coaxial for video.

## Utilities

Electrical power in labs should include a minimum of one outlet per student located at student workstations if provided (14 duplex outlets for 28 students). Food/nutrition science and multipurpose labs, and any lab using equipment with the potential for injury must be provided with emergency shut-off capability. All demonstration tables should have a minimum of two duplex outlets.

In food/nutrition science and multipurpose labs a minimum of one sink should be provided for every four students assigned to the lab, and one large sink (at least 24" long x 18" wide by 12" deep). Hot and cold water should be provided at every sink. In other labs, a minimum of two sinks should be provided, one being a large sink that has both hot and cold water. Demonstration tables should be equipped with a large sink with hot and cold water. All hot water should be heated to a temperature no higher than 130 degrees. Child development labs must provide child height sink and bubbler and lavoratories for children.

Gas may be provided at the demonstration station in high school food/nutrition science and multipurpose labs, and one gas cock for every two students at student workstations. If gas is provided, a master control valve should be installed.

# Summary of Minimum Space Requirements

## Family and Consumer Sciences Education
## Summary of Minimum Space Requirements

| School Level | Middle | Middle |
|---|---|---|
| **Number of Teaching Stations (TS)** | 1 TS | 2 TS |
| **Student Capacity** | 28 | 28/Lab |
| **Laboratory** | | |
| Multipurpose | 1512 | 1512/Lab |
| General | ------ | 1064-1400 |
| Food/Nutrition | ------ | 1512 |
| Child Development | ------ | ------ |
| Interdisciplinary | ------ | ------ |
| **Support Areas** | | |
| General Storage | 125 | 100-125/Lab |
| Outdoor Storage | ------ | ------ |
| Teacher Planning | 60 | 120 (60/Teacher) |
| Student Project | Optional | Optional |
| Observation | ------ | ------ |
| **Total Net Square Feet** | 1697 | Variable |

| School Level | High | High |
|---|---|---|
| **Number of Teaching Stations (TS)** | 1 TS | 2 or More TS |
| **Student Capacity** | 28 | 28/Lab |
| **Laboratory** | | |
| Multipurpose | 1624 | 1624 |
| General | ------ | 1064-1400 |
| Food/Nutrition | ------ | 1512 |
| Child Development | ------ | 1750 (lab + classroom) |
| Interdisciplinary | ------ | Variable |
| **Support Areas** | | |
| General Storage | 150 | 75-150/Lab |
| Outdoor Storage | ------ | 75 (child dev. only) |
| Teacher Planning | 60 | 60/Teacher |
| Student Project | Optional | Optional |
| Observation | ------ | Optional (child dev. only) |
| **Total Net Square Feet** | 1834 | Variable |

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