

# FOOD LAND AND PEOPLE: CONTENT ANALYSIS AND CORRELATION TO ARKANSAS STATE STANDARDS

*David Powell, Graduate Assistant*  
*David M. Agnew, Associate Professor*  
*Mark McJunkin, Assistant Professor*  
Arkansas State University

## Abstract

*Project Food, Land, and People (FLP), is a comprehensive K-12 curriculum that teaches about the interconnectedness of the environment, food, and society. Because teachers in Arkansas need to follow state guidelines, the curriculum was correlated to the state standards, revealing a systematic, thorough integration of academic subjects with agriculture. The FLP lessons address 75% of the Student Learning Expectations (SLEs) in the Arkansas Science Framework in grades K-4 (including 100% of life science SLEs), 66% of science SLEs in grades 5-8 (including 81% of life science SLEs), and 37% of science SLEs in grades 9-12 (including 63% of life science SLEs). FLP addresses 70% of the SLEs in the Arkansas Math Frameworks in grades K-4, 41% in grades 5-8, and 29% in grades 9-12. FLP addresses 69% of the SLEs in the Arkansas Social Studies Frameworks in grades K-4, 56% in grades 5-8, and 43% in grades 9-12. The FLP curriculum, consisting of 55 units, incorporates 45% of all SLEs in the Arkansas Curriculum Frameworks in all subject areas in grades K-4, 35% in grades 5-8, and 25% in grades 9-12. Documenting this connection provides justification of program appropriateness for teachers to consider in adoption and implementation of this curriculum.*

## Introduction

Agricultural education has long been an important part of vocational education in the public school; but, like the rest of the larger discipline of vocational education, its focus and application is changing with changing workforce demands and expectations of society. "The primary goal of vocational education is to prepare youth and adults for employment." (Imel, 1989, p. 3). This goal of vocational educators has assumed greater national importance throughout the last quarter century. Since the 1980s, the range of competencies expected of workers by employers has expanded well beyond specific occupational training into a broad array of academic and interpersonal skills. While the vocational intent of instruction remains a vital part of agricultural education, the mission has been expanded to include agricultural literacy, as suggested by the 1988 report of the National Research Council (NRC). That report stated that agriculture "is too important a topic to be

taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (NRC, 1988, p. 8) and that all students should receive systematic instruction about agriculture incorporated into existing courses in grades K-12.

In 1991, the U.S. Department of Labor issued a report to help teachers "understand how curriculum and instruction must change to enable students to develop those high performance skills needed to succeed in the high performance workplace" (SCANS/Academic Innovations Web Summary, 1991, p. 1). More and more, employers believe that vocational education should focus on the development of applied basic academic skills. The SCANS report outlined competencies in basic skills, thinking skills, and personal qualities needed to succeed in the workplace. The basic skills that this report identified included reading, writing, mathematics, listening, and speaking as those that form a fundamental knowledge base.

These reports recommended expanding the mission of agricultural education to include agricultural literacy in all subjects, with an emphasis on how academic subjects relate to agriculture and the integration of applied academic skills. Although agricultural education has made great strides in responding to the recommendations of both reports, considerable debate still exists on how to achieve the desired results of this change in the curriculum.

When selecting a curriculum for adoption, teachers must recognize and believe in the need for change as well as “be able to recognize problems that can be addressed by the adoption of the curriculum” (Conroy, 1999, p. 2-3). However, the requirement to follow a state-mandated curriculum with specific goals and objectives in order to enable students to pass subject-area state achievement tests leaves teachers limited opportunity to teach vocational competencies such as those that build agricultural literacy unless those competencies can be directly tied to the core curriculum academic frameworks (Blackburn, 1999). Project Food, Land and People was designed to meet the need for an integrated curriculum in both vocational and non-vocational courses that could be used at both the elementary and secondary levels.

Project Food, Land and People (FLP) is a comprehensive resource for teaching in Pre-K-12 about the interconnectedness of the environment, our food supply, and their relationship or impact on society (Project Food, Land, and People, 2004). More than 1600 professional educators and agriculturalists worked together for more than 10 years to develop frameworks, select topics for lessons, develop and pilot test the lessons, and finally make the FLP curriculum available to the public (Project Food, Land and People, 2003a). The 55 lesson units of the FLP program systematically and thoroughly integrate academic core subjects of science, math, language arts, and social studies, as well as off-core activities in the fine arts, physical education and health into the broadly thematic study of agricultural literacy and agricultural awareness. As of 2003, 27 states had adopted the curriculum (Project Food, Land and People, 2003b).

## Theoretical Framework

A joint effort to incorporate basic skills instruction into vocational curriculum has these basic assumptions: academic skills are “embedded” into vocational courses, vocational tasks provide real-world uses for academic skills, putting these skills into an everyday context strengthens the academic skills, and neither academic skills nor vocational skills should be taught in isolation (Pritz & Crowe, 1987). Using academic concepts to solve problems related to agriculture is a very effective way to combine academic and vocational instruction through contextual teaching and learning.

The Kentucky Education Reform Act, one of the most sweeping statewide reforms in recent decades, called for the connection and integration of experiences and knowledge throughout the curriculum, applying concepts in the context of real-life situations (Ohio State University, 1999). Integrating vocational and academic content helps students understand the content of both disciplines (Berns & Erickson, 2001) by incorporating real world examples through contextual learning (Karweit, 1998). To this end, Colorado State University has routinely combined its vocational and academic teacher training classes into a single side-by-side program so teachers would know how to embed the principles of one discipline into the other, relating academic content to the context of real-world problems (Ohio State University).

Contextual teaching provides authentic and appropriate applications for learning, incorporating real-world activities and purposes into an intentionally designed environment to reconnect knowledge to use (Berns & Erickson, 2001; Karweit, 1998). This approach is multidisciplinary and experiential, synthesizing information from many sources (Berns & Erickson; Brown, 1998). Strategies of contextual teaching and learning that make use of these close ties to actual experience (National School-to-Work Office, 1996) have been instrumental in helping students construct knowledge that is personally meaningful (Brown).

Problem-solving activities embed the very decision-making processes and workplace competencies identified by SCANS as essential to success in the workforce. These activities are realistic working world problems that incorporate the personal qualities necessary for effective social interaction and decision-making. Just as importantly, problem-based vocational academic learning provides reinforcement for basic skills needed with a suitable degree of guidance on how to proceed. This not only assists in learning; it helps to develop a persistence to see a job through to completion.

Mastery of academic content and the need for a more interactive and student centered classroom has been identified as essential to the integration of higher-order theoretical and conceptual skills into vocational education (Kisailus, 1994). Since the ability to learn constantly through thinking, reasoning, problem-solving, and interpersonal relations is critical to both one's work and one's personal life, "higher-order thinking skills are essential and must be taught" (Kerka, 1992, p.1). However, higher-order thinking skills are not just the province of an academic curriculum. Since learning is not automatically transferred to new settings, the context of learning is critical to understanding and active learning develops cognitive management skills. Higher-order thinking constructs meaning from experience rather than simply changing behavior (Johnson & Thomas, 1992). Agricultural education provides a real-world context for cognitive development, teaching students "how to think instead of what to think" (Chalupa, 1992, p. 21).

FLP follows the intent and many of the processes of the curriculum integration models developed by Grubb, Davis, Lum, Plihal, and Morgaine (1991) to incorporate academic content into vocational courses, facilitate collaboration between vocational and non-vocational teachers, and horizontally and vertically align agriculture with the academic curriculum of the school. The analysis reported in the current paper shows how the FLP lesson content consistently integrates academic subject materials into the context of agriculture and other vocational subjects. Conversely, the

academic content foci of the FLP lessons can be used as a concept and activity base for a curriculum infusion model (NDCI Web Page, 1999) to infuse agricultural literacy and awareness into the curriculum of specific academic content areas. Each FLP lesson unit can stand alone as a conceptual thematic unit providing the activities and content base for a short-term agriculture-related project within an academic course or the entire compendium of FLP lessons can provide the activities and concepts to infuse agricultural literacy and awareness throughout the entire academic course. The documentation of this connection provides an important scaffold for classroom teachers to use in formulating and implementing an integrated curriculum such as FLP with state-mandated frameworks.

### Objectives

The original goal of bringing FLP to Arkansas was to enhance academic skills by using agricultural literacy resources. During a pilot training program in April 2004, facilitators and teachers recommended correlating the FLP lesson content to the state standards to facilitate adoption in the classroom. The objectives of this study were to:

1. Identify the academic (science, math, language arts, and social studies) concepts in the FLP lessons that are part of the Arkansas Curriculum Frameworks.
2. Identify the Student Learning Expectations (SLEs) in the Arkansas Curriculum Frameworks that are contained in the FLP lessons.
3. Determine the extent to which academic concepts in the FLP lessons correlate with the Arkansas Curriculum Frameworks.

### Methodology

Qualitative research methods, as identified by Ary, Jacobs, and Razavieh (1996), were employed to investigate each research question. Primary sources for this investigation were the Project FLP *Resource Guide* and the Arkansas Curriculum

Frameworks, the official legal curriculum documents published on the Arkansas Department of Education web site at <http://arkedu.state.ar.us/curriculum/benchmarks.html> (ADE, n.d).

Each FLP lesson includes a few general objectives, focusing mostly on the integration process rather than the specific subject-area classroom behavioral objectives that are required of teachers to document coverage of academic content. For example, the lesson unit "Expression Connection" has five general objectives for a two-lesson unit including the objectives "identify words and/or phrases that relate in some way to farming in four categories: agriculture, environment, diverse cultures, and you," "use reference books to justify connections," and "justify connections through discussion" (Project Food, Land, and People, 2004, p. 233). Other lesson units have a similar number of objectives at similar levels of specificity for an entire week's worth of lessons. In order to provide concrete and discrete classroom behavioral objectives that addressed specific academic content-related concepts and skills, each FLP lesson unit was analyzed and outlined to specifically identify the individual concepts and activities pertaining to the subject areas of science, mathematics, language arts, social studies, art, music, dance, theater, physical education, and health.

The researcher conducting this analysis is a veteran science teacher in both secondary and middle school settings, with a master's degree in Educational Theory and Practice. The researcher has written several curriculum guides and district curricula in the physical and life science subject areas. He has extensive classroom and district-level experience in curriculum mapping and curriculum correlation, as well as extensive training and experience in planning,

teaching, and correlating lesson units in mathematics and classroom content area writing.

After writing sample classroom behavioral objectives for each concept or activity, the objectives were correlated to the Arkansas Curriculum Frameworks, by comparing them to the wording and intent of the respective Arkansas Curriculum Frameworks for each subject area. This is the same (admittedly subjective) process used by classroom teachers in the daily documentation of content coverage as well as that used by textbook adoption committees and textbook editors in the state-by-state promotion of textbook adoptions. The Arkansas Curriculum Frameworks are published on the Arkansas Department of Education web pages by subject area, e.g. "Mathematics." Each subject area is subdivided into several strands e.g. "Number Sense, Properties and Operations," which are then divided into several individual competencies called "Student Learning Expectations" (SLEs), one of which is "NPO.1.1. Demonstrate number sense (concepts of counting, grouping, and place value) using manipulatives." All strands and SLEs within a subject area are presented in sequence separately by three grade levels of K-4, 5-8, and 9-12.

## Results

Objectives one and two were process objectives, summarized in a 282-page compendium of FLP behavioral objectives and the SLEs from the Arkansas Curriculum Frameworks to which those behavioral objectives correlate (Figure 1). This document is now being distributed to teachers in the state for use as a lesson planning curriculum correlation guide.

19. COULD IT BE SOMETHING THEY ATE (5-8)		PROJECT FOD, LAND & PEOPLE
<i>Lesson Concept/Activity</i>	<i>Framework</i>	<i>Descriptor</i>
<p><b>Science (continued)</b>            Observe growth of microbial colonies on food, note rates of growth, size of colony, appearance of fruiting bodies, etc.            Discuss scientific testing and prevention of food contamination in food processing industries            Use hand lenses or microscopes to observe microbial growth            Interview various workers, supervisors, and inspectors in food Industry, government agencies about food inspection</p>	<p>LS.2.5            LS.3.2            LS.3.4            LS.3.5</p>	<p>Explain life cycles of various organisms.            Correlate life science activities to other curricular areas (e.g., language arts, mathematics, social studies)            Use appropriate equipment, tools, technology, mathematics, and technical writing in scientific investigation            Investigate a variety of careers related to life science</p>
<p><b>Language Arts</b>            Participate in interactive discussion            Listen to oral presentation and comments            Respond to questions and clarify responses as needed            Answer open ended descriptive and interpretive questions in lab reports, write about food safety</p>	<p>OV.1.5.6            – OV.1.8.6            OV.2.5.3            – OV.2.8.3            OV.2.5.4            – OV.2.8.4            W.5.5.1            &amp; W.5.6.1            W.5.5.7            – W.5.8.7            W.5.5.10            – W.5.8.10</p>	<p>Contribute appropriately to class discussion            Listen attentively for main idea and detail            Demonstrate attentive listening skill to respond to speaker's message            Write to describe, to inform, to entertain, and to persuade            Write with and without prompts for a sustained period            Write across the curriculum</p>

Figure 1. Sample page from teacher's guide showing behavioral objectives and Student Learning Expectations (SLEs).

Note. LS = Life Sciences; OV = Oral Visual; and W = Writing.

The results of objective three of this study are presented herein as frequencies and percentages of coverage in curriculum. The overall correlation results comparing the FLP program to the Arkansas Curriculum Frameworks are presented in Table 1. Science and language arts were represented by the largest number of SLEs in the Arkansas Curriculum Frameworks

used at least once (131 and 123), but the largest number of total incidents of usage occurred in language arts and social studies (1232 and 1046). The content area with the fewest number of SLEs (39) and the lowest occurrence of total incidents of usage (173) was in the combined area of physical education/health.

Table 1  
*Number of Student Learning Expectations (SLEs) Used in FLP Lessons and Total Occurrences by Content Area*

Subject	Grades K-4		Grades 5-8		Grades 9-12		All Grades	
	Number of SLEs	Total Usage	Number of SLEs	Total Usage	Number of SLEs	Total Usage	Number of SLEs	Total Usage
Science	42	327	49	378	40	170	131	875
Math	33	217	18	172	13	94	64	483
Language	52	475	41	509	30	248	123	1232
Social Studies	38	395	30	395	23	256	91	1046
Fine Arts	25	89	27	253	16	105	68	447
PE/Health	21	86	14	70	4	17	39	173

The numbers of SLEs used and their total incidence give a broad picture of the comprehensiveness of the FLP program and its applicability to the Arkansas curriculum requirements. Comparison of the numbers of SLEs utilized by FLP to the total number of SLEs in each subject area and strand within the subject area gives a much more relevant picture of the overall usefulness of FLP in meeting Arkansas' curricular needs.

A comparison of the number of SLEs used in FLP to the total number of SLEs in the Arkansas Science Framework is presented in Table 2. The FLP lessons addressed 75% of all SLEs in the Arkansas Science Framework in grades K-4, 66% of those in grades 5-8, and 37 % of those in

grades 9-12. However, the three strands of physical science, life science, and earth science were not represented equally, which is consistent with the content inherent in agriculture as the unifying theme of FLP. Life science was most completely addressed at all grade levels, with 100% of the SLEs in the Arkansas Science Framework addressed in grades K-4, 81% in grades 5-8, and 63% in grades 9-12. FLP addressed 83% of the earth science SLEs and 48% of the physical science SLEs in grades K-4, 57% of the earth science SLEs and 65% of the physical science SLEs in grades 5-8, and 24% of the earth science SLEs and 29% of the physical science SLEs in grades 9-12.

Table 2  
*Comparison of Student Learning Expectations (SLEs) used in FLP and Total Number of SLEs in the Arkansas Science Framework (ASF)*

Strand	SLEs for Grades K-4			SLEs for Grades 5-8			SLEs for Grades 9-12		
	FLP	Total ASF	% of Total	FLP	Total ASF	% of Total	FLP	Total ASF	% of Total
Physical Science	10	21	48%	15	23	65%	12	42	29%
Life Science	17	17	100%	17	21	81%	20	32	63%
Earth Science	15	18	83%	17	30	57%	8	33	24%
Total	42	56	75%	49	74	66%	40	107	37%

Table 3 presents a comparison of the number of SLEs used in FLP to the total number of SLEs in the Arkansas Math Framework. FLP lessons addressed 70% of the SLEs in the Arkansas Math Framework in grades K-4, 41% of those in grades 5-8, and 29% of those in grades 9-12. The strands of Measurement, Data Analysis and Statistical Probability (“data analysis”), and Number Sense, Properties and Operations (“number sense”) were most fully represented both in percentages and actual occurrences of usage. FLP used 100% of the Measurement SLEs in grades K-4, 86% in grades 5-8, and 38% in grades 9-12. In the “number sense” strand, FLP used 75% of the SLEs in the Arkansas Math Framework in grades K-4, 36% of those in grades 5-8 and 56% of those in grades 9-12. FLP used 82% of the “data analysis” SLEs in grades K-4, 40% of those in grades 5-8 and 38% of those in grades 9-12. Judging from percentages alone, Geometry and Spatial Sense (“geometry”) would appear to be highly utilized, but these SLEs were only used in a few lessons: six units in grades K-4, four in grades 5-8, and two in grades 9-12. The Patterns and Algebra Functions (“algebra”) strand was hardly used at all, with “algebra” SLEs in only one lesson unit in grades K-4, three in grades 5-8, and none in grades 9-12.

A comparison of the number of SLEs used in FLP to the total number of SLEs in

the Arkansas Social Studies Framework is presented in Table 4. Overall, FLP used 69% of the SLEs in the Arkansas Social Studies Framework in grades K-4, 56% of those in grades 5-8, and 43% of those in grades 9-12. The strongest representation in social studies was in Time, Continuity and Change (“history”), People, Places and Environments (“geography”), and Production, Distribution and Consumption (“economics”). Strands least represented were Power, Authority and Governance (“government”) and Social Sciences Processes and Skills (“processes”). FLP used 83% of the “history” SLEs in grades K-4, 75% of those in grades 5-8, and 60% of those in grades 9-12. In “geography,” FLP used 69% of the SLEs in the Arkansas Social Studies Framework in grades K-4, 81% of those in grades 5-8, and 40% of those in grades 9-12. Of the total number of “economics” SLEs, FLP used 82% in grades K-4, 72% in grades 5-8, and 44% in grades 9-12. Although FLP lessons used a relatively small proportion of the total “processes” SLEs (60% in grades K-4, 40% in grades 5-8, 36% in grades 9-12), those that were used were used extensively in nearly every lesson with a social studies component. Only three or four “government” SLEs were used at each grade level, two of them only once in the entire program.

Table 3  
*Comparison of Student Learning Expectations (SLEs) used in FLP and Total Number of SLEs in the Arkansas Math Framework (AMF)*

Strand	<u>SLEs for Grades K-4</u>			<u>SLEs for Grades 5-8</u>			<u>SLEs for Grades 9-12</u>		
	FLP	Total AMF	% of Total	FLP	Total AMF	% of Total	FLP	Total AMF	% of Total
Number Sense	9	12	75%	4	11	36%	5	9	56%
Geometry	7	11	64%	3	7	43%	2	10	20%
Measurement	7	7	100%	6	7	86%	3	8	38%
Data Analysis	9	11	82%	4	10	40%	3	8	38%
Algebra	1	6	17%	1	9	11%	0	10	0%
Total	33	47	70%	18	44	41%	13	45	29%

Table 4  
*Comparison of Student Learning Expectations (SLEs) used in FLP and Total Number of SLEs in the Arkansas Social Studies Framework (ASSF)*

Strand	<u>SLEs for Grades K-4</u>			<u>SLEs for Grades 5-8</u>			<u>SLEs for Grades 9-12</u>		
	FLP	Total ASSF	% of Total	FLP	Total ASSF	% of Total	FLP	Total ASSF	% of Total
History	10	12	83%	6	8	75%	6	10	60%
Geography	9	13	69%	13	16	81%	6	15	40%
Economics	9	11	82%	6	8	75%	4	9	44%
Government	4	9	44%	3	17	18%	3	9	33%
Processes	6	10	60%	2	5	40%	4	11	36%
Total	38	55	69%	30	54	56%	23	54	43%

Table 5 presents a comparison of the number of SLEs used in FLP to the total number of SLEs in the Arkansas Language Arts Framework. Correlation of the FLP lesson units to the Arkansas Language Arts Frameworks would be deceptive taken from an overall percentage basis alone. There are a great many language arts SLEs in the Arkansas Language Arts Framework and the majority of those are in the writing and reading strands. Most of the SLEs in the writing strand specifically address process issues of prewriting, mechanics, usage, and editing. Unless the FLP lesson clearly indicated these process skills, they were not

included in the analysis and correlation for this study; therefore, many SLEs that would be used in the normal course of teaching reading and writing were severely under-represented in this analysis. Most of the SLEs in the reading strand address the selection and use of fiction in reading. Many of the FLP lessons did not include specific student reading passages or directions to engage in outside reading. No reading SLEs were cited if reading was not specifically indicated by the lesson format, although it might be implied that a certain level of reading occurred.

Table 5

*Comparison of Student Learning Expectations (SLEs) used in FLP and Total Number of SLEs in the Arkansas Language Arts Framework (ALAF)*

Strand	SLEs for Grades K-4			SLEs for Grades 5-8			SLEs for Grades 9-12		
	FLP	Total ALAF	% of Total	FLP	Total ALAF	% of Total	FLP	Total ALAF	% of Total
Oral/Visual	21	27	78%	12	18	67%	5	14	36%
Writing	11	76	14%	18	50	36%	18	49	37%
Reading	14	65	22%	8	57	14%	4	48	8%
Research/Inquiry	6	8	75%	3	9	33%	3	12	25%
Total	52	176	30%	41	134	31%	30	123	24%

Given the restrictions already described, some important trends in language arts usage emerged from the analysis. High levels of usage in oral and visual communications were shown at both the K-4 and 5-8 grade levels (78% in grades K-4 and 67% in grades 5-8), most of that in basic classroom communication skills such as using content vocabulary, listening, participating in discussion, and following directions. This was one area where some latitude was exercised in interpreting and applying the SLEs to the FLP lesson format. Even so, a substantial proportion of the total lessons directly used oral presentation skills

(eight in grades K-4, 15 in grades 5-8, and eight in grades 9-12). Another area with a high percentage of usage in grades K-4 was in research/inquiry (75%). At the upper grade levels, this strand employs more extensive use of question generation and more advanced research skills that, while they may be implied and expected, were not specifically requested. FLP lessons used a much smaller percentage of research/inquiry SLEs at the upper grade levels (33% in grades 5-8 and 25% in grades 9-12), but they were used very widely in almost all the lessons. Despite the low percentages in numbers alone, SLEs for producing

consistent written products, such as “writing across the curriculum” and “writing to inform, [etc.]” were also used in almost every FLP lesson.

Table 6 presents a comparison of SLEs from the Arkansas Curriculum Frameworks used in FLP lesson units with the number of SLEs in the off-core curriculum areas of art, music, dance, theater, physical education, and health. There are several issues to consider when describing the analysis results of the correlation of FLP lesson content to off-core Arkansas Curriculum Frameworks. Most of the Arkansas Fine Arts Frameworks specifically address issues of technique, composition, and appreciation that were not part of the FLP lessons. As shown in Table 7, artwork, whether “creative” or “illustrative” was an important activity in 73% (39 out

of 54) of the FLP lessons in grades K-4 and 5-8, and 57% (20 out of 35) of the FLP lessons in grades 9-12. Music, mostly singing content-related lyrics set to a familiar tune or music appreciation and interpretation, was an element in 39% (16 out of 41) of the FLP lessons for grades K-4, 29% (14 out of 49) of those for grades 5-8, and only 9% (three out of 35) of those for grades 9-12. Dance was only used in four FLP lessons for grades K-4 (10%), four lessons for grades 5-8 (8%) and two lessons for grades 9-12 (6%). Theater, largely role-playing activities, but occasionally the production or acting out of skits, featured in ten (24%) of the FLP lessons for grades K-4, seven (14%) of the lessons for grades 5-8, and four (11%) of the lessons for grades 9-12.

Table 6

*Comparison of Student Learning Expectations (SLEs) used in FLP and Total Number of SLEs in the Arkansas Curriculum Frameworks (ACF)*

Subject	<u>SLEs for Grades K-4</u>			<u>SLEs for Grades 5-8</u>			<u>SLEs for Grades 9-12</u>		
	FLP	Total ACF	% of Total	FLP	Total ACF	% of Total	FLP	Total ACF	% of Total
Art	6	27	22%	8	28	29%	6	22	27%
Music	7	26	27%	7	19	37%	3	32	9%
Dance	1	44	2%	7	52	13%	5	37	14%
Theater	11	35	31%	5	55	9%	2	26	8%
Subtotal	25	132	19%	27	154	18%	16	117	14%
Phys. Ed.	7	24	29%	4	12	33%	1	16	6%
Health	14	36	39%	10	42	24%	3	46	7%
Subtotal	21	60	35%	14	54	26%	4	62	6%

As shown in Table 8, physical education appeared in the context of classroom games and expressive activities associated with dance or pantomime. Physical education was featured in 12 (29%) of the FLP lessons for grades K-4, 11 (22%) of the lessons in grades 5-8, and six (17%) of the lessons for grades 9-12. Health was featured in 14 (34%) of the FLP lessons for grades K-4, 12 (24%) of the lessons for grades 5-8, and seven (20%) of the lessons for grades 9-12.

Even though the off-core content areas of the fine arts, physical education and health as utilized in FLP were correlated to fewer SLEs in the Arkansas Curriculum Frameworks, these subject areas were integrated throughout the program of study in several general activity categories as shown by the list of FLP lesson units containing these activities in Tables 7 and 8.

Table 7  
*Notable Uses of Arkansas Fine Arts Frameworks in FLP*

Subject	Activity	FLP Units (K-4)	FLP Units (5-8)	FLP Units (9-12)
Art	Illustration	9, 10, 12, 15-18, 24, 26, 27, 29, 30	9, 10, 12, 15-18, 24, 26, 27, 29, 30, 42	24, 29, 30, 42
	Creative (Group project)	4, 6-8, 11, 18, 22, 25, 30, 37-39	6-8, 11, 18, 22, 25, 30, 37-39, 44, 48	22, 25, 30, 37-39, 44, 48
	Creative (Individual project)	3, 5, 9, 14, 18-21, 23, 28, 31, 34, 35, 39	9, 14, 18-21, 23, 28, 31, 34, 35, 39, 50, 54	11, 21, 31, 34, 35, 39, 50, 54
Music	Singing	3, 10, 11, 13, 14, 18, 19, 29	10, 11, 13, 14, 18, 19, 29	11, 12
	Compose/Perform	14, 20, 21, 23, 28	14, 20, 21, 23, 28	21
	Interpretation	1, 7, 20, 21	7, 20, 21	NA
	Appreciation	6	6, 44	44
Dance	Apprec./Interpr.	6, 20, 21, 23	6, 20, 21, 23	21
Theater	Role Play or Pantomime	2, 10, 5, 20, 21, 28, 34	10, 20, 21, 28	21
	Skits/Drama	3, 7, 20, 21, 28, 38	7, 15, 20, 21, 28, 38, 44	21

Table 8  
*Notable Uses of Arkansas Physical Education and Health Frameworks in FLP*

Subject	Activity	FLP Units (K-4)	FLP Units (5-8)	FLP Units (9-12)
PE	Games and Group Activities	4, 11, 13, 15, 20, 24, 25	11, 13, 15, 20, 24, 25, 48	NA
	Expressive Movement	1, 2, 17, 21, 28	17, 21, 28	NA
Health	Diet and Nutrition	1, 3, 8, 12, 28, 30, 31, 39	12, 30, 31, 42, 47, 48	30, 31, 39, 42, 47
	Prevent Disease, Mental, Dental	5, 11, 15, 19, 24, 25	11, 15, 19, 24, 25, 39	11, 12

### Conclusions

All of the core curriculum areas of science, math, language arts, and social studies were systematically and thoroughly integrated into an agricultural literacy base in FLP. The lessons utilized a majority of the number of Student Learning Expectations (SLEs) in the Arkansas Science, Mathematics and Social Studies Frameworks, especially for grades K-4 and 5-8. FLP lessons utilized the largest number of SLEs in grades K-4 and 5-8 in science and social studies, including 100% of the K-4 life science SLEs. The social studies strand of "government" was little utilized at all grade levels. Mathematics showed strong correlation with the Arkansas Curriculum Frameworks for grades K-4, especially in the measurements strand, correlating to 100% of the SLEs in that strand. FLP utilized fewer SLEs in mathematics for grades 5-8 in all strands except measurement. The mathematics strand of "algebra" was also little utilized at all grade levels. FLP correlated to less than a third of all Arkansas Language Arts Frameworks at all grade levels, but the SLEs that were used in basic process skills of oral and visual communication and writing for specific purposes across the curriculum were integrated into almost all units in the FLP

program. Similarly, small numbers of SLEs were used in the off-core content areas of the fine arts and physical education, but these important physical and expressive activities were also integrated into nearly all the FLP lessons. Nearly one third of all FLP lesson units incorporated some aspect of health that correlated with the Arkansas Frameworks.

When compared by grade level groups, FLP lessons appeared to be stronger and more fully developed for the K-8 grade levels, especially in the younger half of this range. Fewer lessons were aimed at grades 9-12 (35 compared to 41 for grades K-4 and 49 for grades 5-8), and many of these addressed general issues for a range of grades rather than the more complex process and investigative skills of upper grade levels. Another problem affecting the assessment of the FLP program's utility for the upper grades is that many Arkansas Frameworks for grades 9-12 are very content-specific and not easily addressed by a broad integration into general agricultural literacy topics. Conversely, the higher-order thinking and process skills used in FLP lesson units developed and aimed specifically for the upper grades were few in number but very effectively integrated, so what may have been missing in quantity is made up for in quality.

## Recommendations and Implications

The most immediately usable outcome of this analysis was the lesson-by-lesson subject-area-specific behavioral objectives correlated to the required state frameworks, which teachers indicated was needed to justify their use of this resource. This resource serves double duty as an easily accessible planning instrument and a documentation index for fulfilling state content area requirements. Other specific recommendations are:

1. Manuscript copies of this report, a PowerPoint Presentation of FLP resources, and the CD-ROM version of the correlation analysis should be made available to agricultural education teacher preparation programs in the state to help pre-service agricultural education majors and currently active in-service teachers gain a better understanding of the potential for horizontal and vertical integration of academic and agricultural/environmental content.
2. In the same manner, these resources should be made available to teacher education programs in the core subject areas of science, math, language arts, and social studies to assist pre-service education majors and currently active in-service teachers in the development of horizontal and vertical integration of academic content within an agricultural context.
3. The strength of the correlation to existing academic requirements provides ample justification for inclusion of agricultural content using FLP resources in science, math, language arts, and social studies, especially at the elementary and middle school levels where there is little inclusion of agricultural content. Sharing information and resources developed from this study with current teachers will help them become aware of the need for early exposure to agriculture and the ease

with which they can meet this need through the FLP program as they develop strategies for achieving state standards.

4. Systematic follow-up of previously-trained teachers and facilitators should be employed to encourage implementation and use of the FLP program in schools and to help gather feedback that can lead to instructional improvements for all students.

In order to generalize these findings, it would be necessary to compare this state's curriculum frameworks to other states. This comparability was implicit in the formulation of the Arkansas Curriculum Frameworks and an overview of the wording and intent inherent in the broad content and activity expectations seems to support such an assumption. If other states do indeed use a similar set of frameworks or standards, it would be logical to expect that these FLP lesson concepts would be highly correlated with their own frameworks also. However, for other states to be able to determine without doubt that a correlation exists, a correlation analysis would have to be done for each state. Doing so would support the integration of this agricultural and environmentally based curriculum into their schools.

Since the FLP program correlates so strongly to state standards, it is more likely to be adopted by teachers. Using this resource will strengthen literacy in agricultural and environmental knowledge while teaching the core content areas of science, math, language arts, and social studies, meeting the goals of agricultural and environmental literacy simultaneously with meeting the goals of the educational community at large.

## References

ADE/Arkansas Department of Education. (n.d.). *Curriculum frameworks* (index). Retrieved June 6, 2004, from <http://arkedu.state.ar.us/curriculum/benchmarks.html>

Ary, D., Jacobs, L. C., & Razavieh, A. (1996). *Introduction to research in education* (5th ed.). New York, NY: Harcourt Brace College.

Blackburn, D. A. (1999, August). Ag science fairs: the text wave in agricultural literacy. [Electronic version]. *Journal of Extension*, 37(4).

Berns, R. G., & Erickson, P. M. (2001). Contextual teaching and learning: Preparing students for the new economy. *The Highlight Zone: Research @ Work No.5*. Columbus, OH: National Dissemination Center for Career and Technical Education. (ERIC Document Reproduction Service No. ED452376).

Brown, B. L. (1998). *Applying constructivism in vocational and career education*. Information series no. 378. Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education. (ERIC Document Reproduction Service No. ED428298).

Chalupa, M. R.. (1992, October). Critical thinking—getting minds to work. *Business Education Forum*, 47 (1). 21-24.

Conroy, C. A. (1999). Identifying barriers to infusion of aquaculture into secondary agriscience: adoption of a curriculum innovation. [Electronic version]. *Journal of Agricultural Education*, 40(3).

Grubb, W. N., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). The cunning hand, the cultured mind: Models for integrating academic and vocational education. University of California, Berkeley, National Center for Research in Vocational Education. In S. E. Berryman et al. (Ed.). *Integrating academic and vocational education: an equitable way to prepare middle level students for the future*. ERIC/CUE Digest 83, (ERIC Document Reproduction Service No. ED354283). Retrieved July 20, 2004, from <http://www.ericfacility.net/ericdigests/ed354283.html>

Imel, S. (1989). *Employers' expectations of vocational education*. ERIC Digest No. 90. (ERIC Document Reproduction Service No. ED312454). Retrieved July 20, 2004 from [http://www.ericfacility.net/databases/ERIC\\_Digests/ed/312454.html](http://www.ericfacility.net/databases/ERIC_Digests/ed/312454.html)

Johnson, S. D., & Thomas, R. (1992, January). Technology education and the cognitive revolution. *Technology Teacher*, 51(4), 7-12 (EJ435379).

Karweit, N. (1998). Contextual learning: a review and synthesis. In A. M. Milne (Ed.). *Educational reform and vocational education*. (pp. 68-69) (ERIC Document Reproduction Service No. ED421659)

Kerka, S. (1992). Higher order thinking skills in vocational education. ERIC Digest No. 127, (ERIC Document Reproduction Service No. ED350487). Retrieved July 20, 2004 from <http://www.ericfacility.net/ericdigests/ed350487.html>

Kisailus, E. C. (1994, Fall). Toward a new vocational and career education. [Electronic version]. *On Common Ground*. Yale-New Haven Teacher's Institute.

National Research Council. (1988). *Understanding agriculture: New directions for education*. Washington, D. C.: National Academy Press.

National School-to-Work Office. (1996). Contextual learning resource bulletin. National School-to-Work Opportunities Office: Washington, DC. (ERIC Document Reproduction Service No. ED 407514)

NDCI/The Network for Dissemination of Curriculum Infusion. (1999, August 9). [Web page summary]. Retrieved October 27, 2004 from <http://www.edc.org/hec/thisweek/tw990809.html>

Ohio State University. (1999). *Contextual teaching and learning in teacher education programs*. Partnerships UNITE to Model Contextual Teaching and

Learning: Ohio State University. (ERIC Document Reproduction Service No. ED454215).

Pritz, S. G., & Crowe, M. R. (1987). Instructional materials development. Ohio State University, National Center for Research in Vocational Education (ED288958).

Project Food Land and People. (2003a). Food land and people chronology: 1988 to 2003. [Brochure]. Chandler, AZ

*Project Food, Land and People Newsletter*. (2003b, Fall/Winter). 14, 1

Project Food Land and People. (2004). *Resources for learning* (2nd ed.)

The Secretary's Commission on Achieving Necessary Skills (SCANS). (1991). *What work requires of schools: A SCANS report for America 2000*. [Academic Innovations Web Summary]. U.S. Department of Labor. Retrieved July 20, 2004, from <http://www.academicinnovations.com/report.html>

DAVID POWELL is a Graduate Assistant in the College of Education at Arkansas State University, P. O. Box 1270, State University, AR 72467. E-mail: [davidv.powell@smail.state.edu](mailto:davidv.powell@smail.state.edu).

DAVID M. AGNEW is an Associate Professor of Agricultural Education in the College of Agriculture at Arkansas State University, P. O. Box 1080, State University, AR 72467. E-mail: [dagnew@astate.edu](mailto:dagnew@astate.edu).

MARK MCJUNKIN is an Assistant Professor of Science Education in the Department of Teacher Education in the College of Education at Arkansas State University, P. O. Box 2350, State University, AR 72467. E-mail: [mmcjunkin@astate.edu](mailto:mmcjunkin@astate.edu).