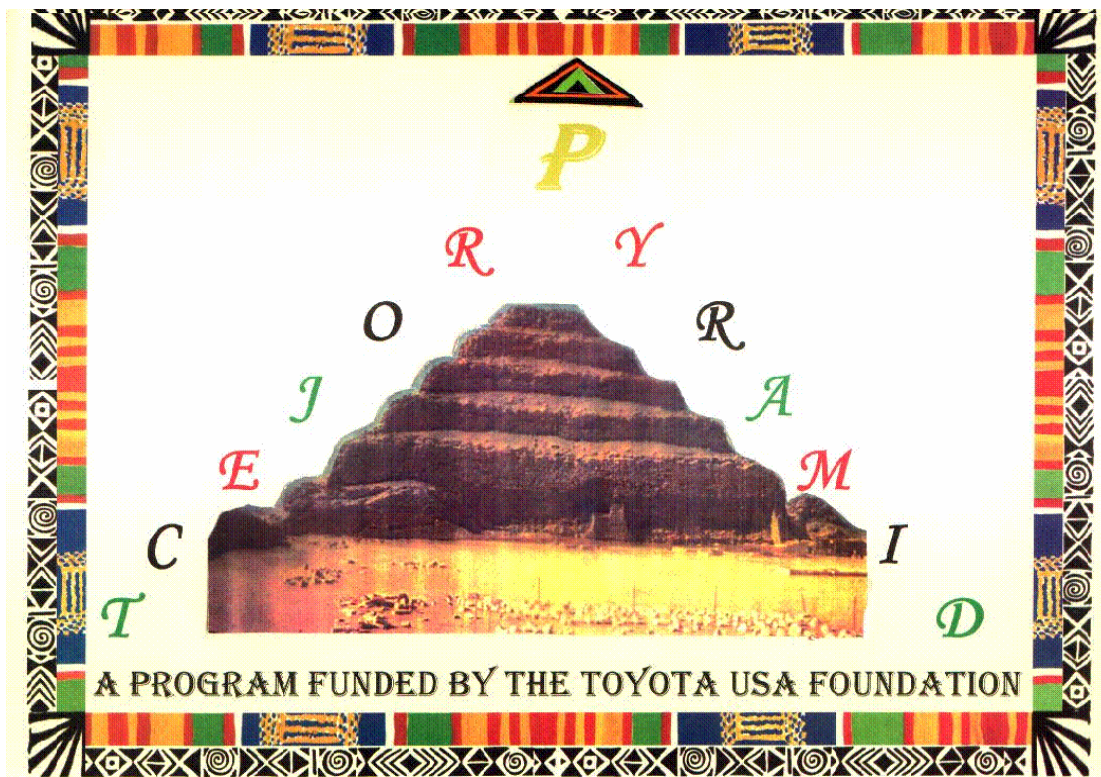


# PROJECT PYRAMID

## *ACTION RESEARCH* SUMMARY FINDINGS

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July, 2005

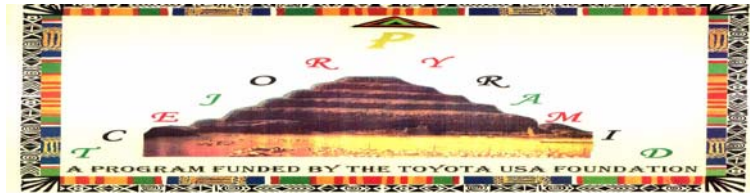
*PROJECT PYRAMID*  
**P**-ROPELLING  
**Y**-OUNG AND  
**R**-ESPONSIBLE  
**A**-FRICAN - AMERICANS IN  
**M**-ATH / SCIENCE MASTERY AND  
**I**-NTELLLECTUAL  
**D**-EVELOPMENT PROGRAM

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## ACTION RESEARCH SUMMARY FINDINGS

### I. PROBLEM DEFINITION

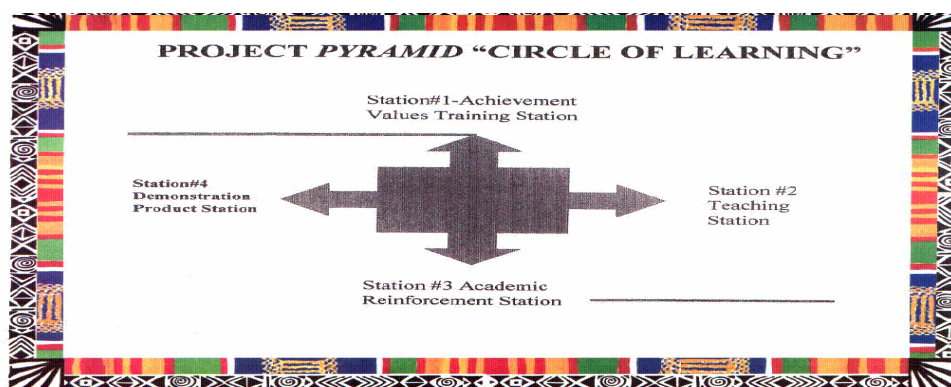
**PROGRAM PURPOSE:** The *Action Research Summary Findings* is an overview of key observations and findings from the executive summaries of the *Reflexive Analysis* and *Program Evaluation Reports* that documented the formulation and implementation of Project PYRAMID. The purpose of Project PYRAMID was to offer an Afrocentric academic empowerment and enrichment program centered around parent and student participation, and was implemented during the 2001-2002 academic year. It was a pilot study funded by the Toyota USA Foundation, and managed through the DuBois-Hamer Institute for African American Achievement (DHI) at California State University, Northridge (CSUN). This program built on the successful Saturday Academy program for high school students currently operated by DHI, and was intended to be Phase I of a multi-phase expansion of college outreach services to the middle school level. Data from Phase I comprised a culturally-based demonstration model to instruct African-American middle school students in math/science, prepare them for college admissions, and encourage them to pursue careers in these fields. Culturally-based instructional strategies in math/science have not received the same attention as other subjects, such as language arts-- and persistently low math test scores suggest a compelling need. Therefore, the intervention strategies in this program— *Propelling Young and Responsible African-Americans in Math/Science Mastery and Intellectual Development (Project PYRAMID)*— sought to address this critical omission.

The cornerstone of Project PYRAMID was the development of a demonstration model for enhancing the math/science proficiency of promising African-American middle school students through immersion in an after-school program utilizing a psychoeducational intervention strategy. This approach incorporated the affective dimensions of learning and cognitive skills development, comprising an holistic instructional process. In this model, parents were recognized as intricate partners in the learning process with their role as co-teachers and nurturers. Students were instructed by college math aides, reviewed math/science contributions by Africans and African-Americans, and exposed to educational and career opportunities in the field. Issues in learning readiness were incorporated, as well as culturally stimulating lessons in math/science skills acquisition.

**SOCIO-DEMOGRAPHIC NEED:** Project PYRAMID addressed the education policy changes in 1999, which eliminated math remediation in the California State University system, and the High School Exit Exam mandated by the California State Board of Education (beginning with 10th graders in 2002) as a requirement for high school graduation. These policy changes represent increased academic hurdles, yet there were few extended learning programs in place to assist students in overcoming these dual hurdles towards college matriculation. Moreover, these policy changes exacerbated the existing educational inequities. In the year 2000, 73% of entering African-American freshmen needed remedial math classes, in contrast with 45% of the general population requiring such support. Increasing academic hurdles, without adding programs to overcome existing and impending barriers has serious implications for the costs to society of maintaining a prospective under-educated future population.

**PILOT STUDY DESIGN:** In this pilot study, 100 students were targeted for an intensive and interactive learning experience, with the goals of: (1) enhancing learning readiness; (2) increasing math skills proficiency; (3) and increasing science proficiency. Adjustments made during the program resulted in three sessions: (1) spring, 2001; (2) summer, 2001; (3) and fall, 2002. To account for possible dropouts, at least 50 students were targeted for outreach at the outset of each session (though we did not set enrollment limits). The intervention strategy, which incorporated both affective and cognitive aspects of learning, ultimately sought to empower students and parents to take charge of their academic aspirations and social destiny. Instructional strategies were culturally appropriate-- including psycho-social elements, active learning styles, cooperative group format-- all of which have been identified as crucial in African-American achievement studies. Students were assessed to obtain baseline academic proficiency levels, and an individualized college preparatory plan were outlined in conjunction with the students and parents. Parents were sent monthly progress reports; and student-instructor learning assessment conferences and recognition events were held monthly.

**“Circle of Learning” Instructional Format:** The program was organized into a "circle of learning" station format, both physically and procedurally. Achievement values training lessons were used to create the journey into learning about African heritage. Students were organized into cooperative learning groups identified as Yoruba (6<sup>th</sup> graders) and Nubians (7<sup>th</sup> & 8<sup>th</sup> graders). Academic and achievement values training activities were infused with cultural themes and materials, and information about African and African-American math/science contributions. The entire class rotated clockwise. There were four stations in the "circle of learning."



Project PYRAMID followed the “circle” guidelines recommended by the Maryland State Department of Education, as an interactive instructional strategy for tutors and teachers described below.

- C-choose content and identify tasks at each station
- I-identify student groups to work at each station
- R-eview time, procedures and products to be developed at each station
- C-irculate from one station to another once input has been presented
- L-ook for connections between the stations (students)
- E-valuate and reflect upon student performance at each station

## II. LITERATURE REVIEW OF PROGRESSIVE PROGRAMS & “PROMISING PRACTICES”

Program Theory of Change: The social change theory underpinning the intervention strategy of Project PYRAMID specifically addresses the psycho-social and academic constructs that comprise the achievement process. Social change in Project PYRAMID aimed at intervention into the learning process, in order to enhance math skills and affective feelings about educational achievement. Dysfunctional study habits and cognition patterns were targeted for transformation into productive performance required by their tutors based on the California math content standards, thus removing the institutional barriers and individual attachment or susceptibility to underachievement. An increase in grade performance level and replacement of non-productive nonproductive habits of mind was observed for all three sessions. Therefore, the scope Project PYRAMID of was multi-level, and incorporated the cognitive and affective dimensions of learning.

Addressing the “Affective” Dimensions of Learning & Achievement Issues: Affective issues, which included such psycho-social elements as fear or feelings of intimidation by the prospect of learning math were dealt with on an individual and contextual basis. We were aware that African-American student performance, has been inhibited by current practices of teaching math in a rote and passive manner, we continually created a variety of strategies reinforcing the active learning style and instructional approach. In targeting a positive development of the self-concept and achievement motivation by covering bibliographic lessons of Africans and African-Americans in math and science, we sought to demystify the experience of acquiring math skills. By addressing the affective dimension, we wanted to significantly influence learning readiness, and dismantle the mental blocks that interfere with grasping math concepts. Through the dialogic method and a math/science cultural approach, students became knowledgeable about the creativity and contributions of Africans and African-Americans in math and science. Each student took turns reading and articulating the significance of African and African-American contributions. In this way I tried to accommodate the insight of African-American mathematician, Beatrice Lumpkin, who noted that "great harm is done to African-American students and other minorities when their history is omitted or distorted. Students are left without role models....For all of these reasons, the introduction of the African heritage of mathematics is an urgent need, not just an optional aid to mathematics education." (Lumpkin, 1987:M-4)

Besides the cultural gaps in the educational process, another affective element in the instructional process that Project PYRAMID addressed were specific “dimensions of learning” pinpointing strengths and gaps of the students in processing information. Crucial prerequisites for skills acquisition, these “dimensions of learning” represent sequential states of mind which predispose receptivity to encoding and decoding information. As stated in the program proposal, there are five affective “dimensions of learning,” which are indicators of learning readiness. (Maryland State Department of Education)

- Thinking that fosters and maintains positive- *Attitudes and Perceptions*  
Helping students develop positive feelings about being accepted and a sense of comfort with the learning environment.
- Thinking needed to- *Acquire and Integrate Knowledge*  
Creating awareness of knowledge as a “constructed” process and involvement of students in organizing and shaping information.
- Thinking needed to- *Extend and Refine Knowledge*  
Developing analytical skills to compare and classify information also apply inductive and deductive reasoning.
- Thinking needed to- *Use Knowledge Meaningfully*  
Performing independent thinking by decision-making, investigation and problem solving.
- Thinking needed to develop productive- *Habits of Mind*.  
Internalizing knowledge and expanding consciousness about practices for educational success.

Consequently, progressive strategies were incorporated into the intervention strategies of Project PYRAMID.



Addressing Multi-Level Factors in Cognitive Development: This section will focus on the influences on cognitive development among African-American students. In Martin's book, *Mathematics Success and Failure Among African-American Youth*, he identified a multi-level framework for addressing math disparities. Although he posed this framework as disparate, but interrelated forces to contend with—the scope of Project PYRAMID is clearly aligned with this framework in the curriculum and program procedures.

***Socio-historical policies and practices*** (negative effects) were tackled through the curriculum content infusion of African and African-American roles in the formation of mathematics. This approach allows students to study how math and science evolved, by reviewing pertinent African and African-American contributors through formative timeline periods from antiquity until contemporary times. Socio-historical policies and practices creating inequities in African-American college preparation and admissions comprise the driving force of the intervention strategy.

***Community/Family Beliefs & Values-*** were addressed through specific lessons, requiring students to reflect about how specific math skills can benefit them in everyday life, and the Black community as a whole. Activities celebrating math milestones and monthly progress assessments connected the family to the students' learning process. Martin's study found that parental attitudes towards math influence the performance of children in math. Although we did not include parents in our sample, we did recognize the importance of parental influence in attitudes towards college—which was the reason for giving parents the *CSUN Learning Plan for College Preparation*.

***School or Learning Environment-*** Project PYRAMID pilot study formed a unique arrangement, by operating on the school grounds. This created a symbiotic relationship with the school administration. (The pilot study took place at Warren Lane School, in the Inglewood Unified School District.) This relationship helped to legitimize the program curriculum for parents and family. Furthermore, sharing school resources (e.g. computer lab and equipment) and the use of several classrooms sustained an ongoing connection between the program curriculum and the school.

***Student Learning Needs-*** were the foci of Project PYRAMID, and were viewed as cognitive and affective dimensions of learning to be addressed through the curriculum. The main strategy utilized was through a multidimensional approach to math in the instructional process. Skills acquisition through cognitive exercises of math computation and deciphering word problems constituted a key focus. However, equally important was the affective aspect designed to strengthen the self-concept through socio-historical lessons and confidence-building rituals. Cognitive skills development curricular lessons included basic arithmetic, pre-algebra, algebra, measurement systems, geometry, and fractals. These lessons were presented in a variety of cultural formats including internet exercises.

These multi-level issues and the interactive instructional strategy were core elements of the Project PYRAMID.

“Promising Practices” Contextualizing Project PYRAMID: In Tate's article *Race, Retrenchment, and the Reform of School Mathematics*, he underscores “the importance of connecting the pedagogy of mathematics to the lives and experiences of African-American students.” (Tate, p.1 <http://www.enc.org/topics/equity/articl.htm>) Emphatically, he argues “that one barrier to an equitable mathematics education for African American students is the failure to ‘center’ them in the process of knowledge acquisition and to build on their cultural and community experiences.” (Tate, p.5 <http://www.enc.org/topics/equity/articl.htm>) Tate observes a paradox that despite an emphasis of reforming the mathematics pedagogy, “**very little has been discussed about building a mathematics program centered on the thinking and experiences of African American children.**” Tate states that the second barrier to an equitable education is the failure to prepare students for democratic participation, using critical thinking in mathematics. Tate “propose[s] the need for a mathematics curriculum and pedagogy that counteracts mathematical production as a function of conflict on two levels: (1) Students are exposed to static knowledge that is skewed towards one viewpoint; (2) Use of mathematics in U.S. society is linked to one group to secure/maintain control of property, thus creating social, political or economic conflict.

The burgeoning field of ethnomathematics described in *African Fractals* by Ron Eglash underscores the importance of culture and politics in math. A similar critique is focus of the “*criticalmathematical literacy*” curriculum proposed by Frankenstein—linking mathematics and politics of knowledge. Moreover, Robert Moses developed the nationwide “Algebra Project” on the premise that mathematics literacy represents the litmus test for advancement in the twenty-first century—and is comparable to the importance of reading literacy in the twentieth century. Likewise, Moses concludes that the denial of adequate mathematics education to African-American students is a *civil rights issue*.

### III. PROCESS ANALYSIS OF PROGRAM PERFORMANCE

Evaluation questions addressed in this process analysis and a summary of the evaluation observations are presented in this below.

❖ ***Did the program function as planned?***

Evaluation Summary: Overall, the planned Afrocentric holistic model was assembled and established as a coherent and viable extended learning program framework.

❖ ***What were its accomplishments?***

Evaluation Summary: The most significant accomplishment was the success in enhancing math grade level skills, which was accomplished in a short period of time (1-3 ½ months). Corollary to this successful outcome was the development of the Project PYRAMID curriculum, systematically organized around the California math content standards, thus incorporating the standards based recommendations in achievement studies. (The Education Trust, 2001) In addition, the African and African-American cultural premise incorporated recommendations by educators to connect math/science to life experiences of African-American students.

❖ ***What were the barriers and related problem solving strategies?***

Evaluation Summary: Recruitment and retention issues seemed to be the greatest barriers, and required the most time for problem solving. At the outset screening criteria for recruitment strategies were revised to accommodate an unanticipated category of students. Instead of receiving referrals for participants that were expressly “responsible” and “uninvolved” in other extracurricular activities, a major proportion of interested participants did not fit these initial program criteria. Redefining the screening criteria was the first problem solving strategy instituted.

As a result of admitting unanticipated types of students it appears that retention was directly affected. Some students became disciplinary problems, requiring the program to develop a “behavior code” protocol leading up to expulsion. Other retention solutions were initiated. However, the retention problem, cited in the literature as endemic to extended learning programs, remained an issue in the pilot study.

❖ ***What modifications were needed to improve effectiveness of the implementation process?***

Evaluation Summary: The most indelible modification was changing the program scheduling and timeframe. This was done because students were oriented around school semesters as the defining timeframe for learning. Therefore, the redefined Spring, Summer, and Fall sessions corresponded to school semesters and enhanced outreach and recruitment efforts. The most important modification for continued implementation would be to craft a more substantial commitment from parents to be physically involved in the program in the form of a volunteer agreement. This could help solve the retention and disciplinary problems.

❖ ***What were the overall lessons learned about program development and implementation?***

Evaluation Summary: “Best practices” from Black studies can successfully be transferred to the pre-college educational experience. “Promising practices” identified in the literature as cutting edge intervention strategies can effectively be developed into a coherent program framework that will enhance African-American math skills. African-American students do respond to a culturally stimulating learning environment, that connects them to the knowledge base. African-American students can learn and improve grade level math skills in a short period of time. Replication of the program and continuation of these extended learning services would be an important outgrowth from this pilot study. Dissemination of the Afrocentric math curriculum, including internet access, would spread these prospective benefits to a wider population of African-American students.

## IV. OUTCOME ASSESSMENT OF PROGRAM PERFORMANCE

### A. Outcome Evaluation Goals and Overall Findings

Outcome analysis assessed the impacts of program outputs, and the Afrocentric holistic instructional model on math skills acquisition of the program participants. Arriving at meaningful conclusions depended on the linkage of African heritage and contemporary African-American community environment to math and achievement outcomes. Fusion of cultural and cognitive issues in the evaluation observations corresponded to the Afrocentric holistic design of Project PYRAMID, and its culturally-based intervention strategies. By incorporating a qualitative and quantitative data base this served to provide a culturally appropriate context for interpreting behavior modalities and statistical findings. Functioning in a hydraulic manner, intervention strategies were designed to increase protective factors that reinforced productive behavioral attitudes—as well as decrease risk factors associated with non-productive behavior performance. Consequently, outcome evaluation assessed these program performance areas:

1. To evaluate the effects of the affective learning behavior/achievement values training intervention strategy on increase of protective achievement factors
2. To evaluate the effects of the holistic instructional model intervention strategy on academic performance and the decrease of academic risk factors.

The outcome analysis employed a one group pre-/post-test research design for observing outcomes of participant performance. Note that the outcome analysis did not seek to test any hypotheses, or make generalizations about program intervention to other populations. This evaluation was a pilot study and observations about the data were solely confined to the students in this research sample. Advantages and disadvantages of the research design must be considered in interpreting the program outcomes. The advantages of this approach is that the pre-test offers a comparison of the before and after performance levels of the same group. "It also provides a control for selection and mortality variables" if the same subjects are exposed to the intervention. (Isaac & Michael, 1990:64) The major disadvantage with this approach is that one cannot definitively conclude that observed changes in performance resulted from the intervention, as opposed to some other intervening factor. Other disadvantages are possible errors due to participant traits, fatigue, testing effects, instrument defects, statistical fluke, and selection bias. Therefore, one must be judicious in attributing change to intervention impacts.

Research Goals: The three goals of the outcome evaluation are re-stated. First, the research sought to observe the impact of affective learning behavior (i.e. achievement values training) on the learning readiness of the tutees. Second, the goal was to document the cognitive skills development (i.e. achievement-attainment) accompanying math/science skills acquisition. Third, the goal was to identify the impact of the holistic instructional model on academic skills acquisition.

The outcome analysis addressed these research questions:

Affective Learning Behavior (Observing the increase in protective factors)

- ❖ *What were the specific changes, if any, in learning readiness (dimensions of learning)?*

**Observation Summary:** Learning readiness could not be determined, because of insufficient data. Slight, but curvilinear, changes in “attitudes & perceptions of learning” and “acquisition and integration of knowledge” were observed. Consequently, these protective factors could not be clearly identified.

- ❖ *Did these changes impact the self-concept?*

**Observation Summary:** Pre/post-test *Self-Concept Survey* results did yield some distinct patterns. “Self-efficacy” and “self-esteem” appeared to be definitely strengthened. Also attitudes about “skills acquisition” (self-competency) seemed to be moderately strengthened. These variables emerged as the most influential protective factors among the achievement correlates.



- ❖ *Did these changes impact achievement-orientation patterns?*  
**Observation Summary:** Pre/post- test *Student Achievement Orientation Survey* results markedly indicated that attitudes towards “community involvement” was strengthened. Other attitudes towards achievement appeared contradictory. Identified from an array of individual-oriented variable items, this collective-oriented protective factor was found to be the most consistent protective factor.
- ❖ *Did these changes impact parent involvement patterns?*  
**Observation Summary:** Parent involvement could not be systematically measured. Individual observations by staff indicated that parents did contact the program when concerned about their children’s participation. This protective factor, proven to be crucial in most achievement studies, needs further examination to identify the extent of association with this population.
- ❖ *What variations in achievement-orientation levels between the pre-test and post-test measures seem to be associated with the intervention strategies?*  
**Observation Summary:** The independent variable patterns were not consistent in the pattern of impacts, and could not be correlated with the dependent variable. Determining the degrees of association between achievement protective factors and the “dimensions of learning” could not be sufficiently measured, and warrants further investigation.

Cognitive Skills Development (Observing the decrease in risk factors)

- ❖ *What were the specific changes, if any, in the math performance levels?*  
**Observation Summary:** Math skills levels markedly increased during each of the three program sessions. The greatest change was observed in the Nubian group (7<sup>th</sup> – 8<sup>th</sup> grades). This outcome strongly indicates that risk factors were substantially decreased, and barriers to math comprehension were removed and cognitive skills enhanced.
- ❖ *What were the specific changes, if any, in the science performance levels?*  
**Observation Summary:** Although science lessons performance was assessed for completion, it was not possible to measure performance levels. Although, science skills were not measured quantitatively, feedback from some teachers indicates an increased interest in science by participants.
- ❖ *Did these changes impact achievement-attainment patterns?*  
**Observation Summary:** This independent variable was initially to be measured by interim monitoring of math skills acquisition. Although, monitoring was attempted using the *Math Skills Weekly Assessment* tool, the flux of students prevented systematic data compilation on the stages of group progress for evaluation. Pinpointing the academic risk factors related to this variable could not be performed, because the research context was not conducive for carrying out interval sampling.
- ❖ *What variations in achievement-attainment levels between the pre-test and post-test measures seem to be associated with the intervention strategies?*  
**Observation Summary:** This independent variable was not observed, because the data could not be sufficiently compiled for evaluation purposes. Measuring the direction of risk factors in association with academic performance levels could not be done and needs further investigation.

The most important result was the observed increase in math skills grade levels for each of the three program sessions suggesting substantial cognitive skills development, indicating a decrease in academic risk factors. This indicated that the Afrocentric holistic curriculum model did indeed have a positive impact on academic achievement.

## B. Program Performance Assessment: Student Math Skills Acquisition

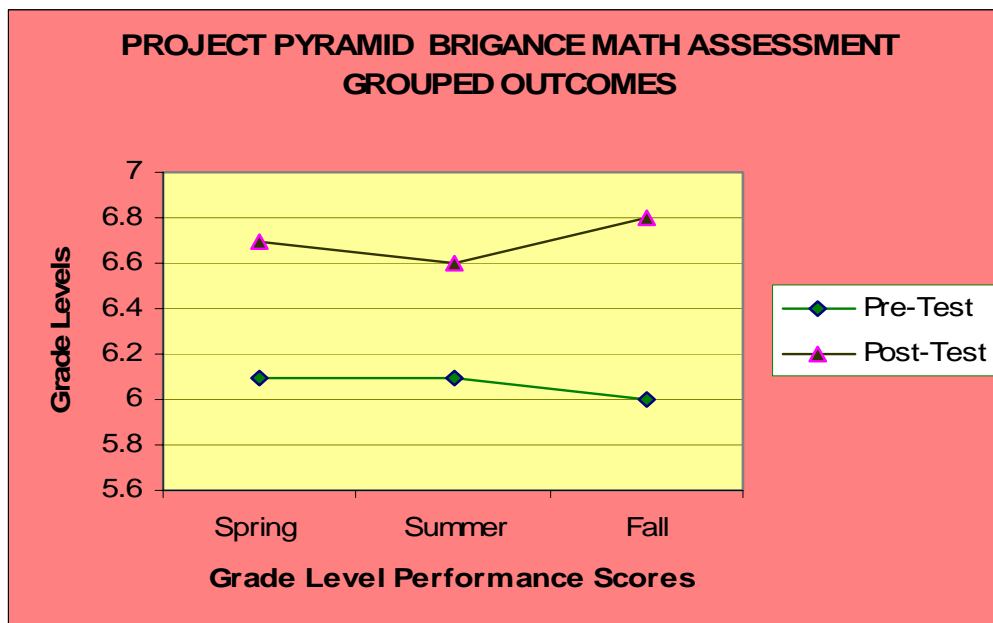
The essential test of the viability of Project PYRAMID can be defined as its ability to improve the math/science competency of its student participants. As noted in the program proposal, **"Math skills acquisition is the primary purpose of the instructional sessions, and will be the main determinant of program success."** In an effort to determine the impact of the program on student math performance pre- and post test scores of participating students were assessed. A total of 115 program participants were administered a *BRIGANCE Comprehensive Inventory of Basic Skills-Revised* pre-test upon entering Project PYRAMID, measuring math competencies of each student at their time of program entry. Upon completion of each program session participants were administered a post-test, and results for 45 students were reported in the findings. (The BRIGANCE inventory consisted of Form A -Pre-Test and Form B-Post-Test, and protected against the confounding effects of testing artifacts.) The *BRIGANCE* was administered to students upon entry into and at the conclusion of Project PYRAMID sessions. The test assessed math skills and was employed by the program to indicate a student's math grade level proficiency and to inform the development of individualized lessons; it was also used to assess gains (changes) in math competency resulting from the immersion in Project PYRAMID's curriculum. It was concluded that Project PYRAMID had a positive impact on student acquisition of math (and science) skills. The basis of this conclusion is presented in the following BRIGANCE data tables.

Table 1. OVERALL PROJECT PYRAMID PRE-/POST-TEST MATH PERFORMANCE

	Pre-Test Mean		Post-Test Mean		% Change
	Math Grade (N Students)		Math Grade (N Students)		
Yoruba	6.1	52	6.1	14	0
Nubians	6.1	63	7.1	31	+1.0
<b>Class</b>	<b>6.1</b>	<b>115</b>	<b>6.7</b>	<b>45</b>	<b>+.6</b>

**Evaluation Observations:** It should be pointed out that these math gains occurred within a short period of time, ranging from 1 month to 3 1/2 months. Given the short timeframe and the formative stage of the program, the improvements in math skills demonstrated that Project PYRAMID achieved its goal, and indicates greater potential for even more success if its operation is extended. (Graphed representations have also been provided as a means of further illustrating the impact of Project PYRAMID on the math competencies of the program's students.)

Figure 1



## V. CONTRIBUTIONS TO KNOWLEDGE AND ACTION

### A. Closer Look at the “Circle of Learning:” Matriculation & Certification

The process and outcome findings suggest that the intervention strategies piloted during the first phase of Project PYRAMID were quite viable for enhancing educational achievement of African-American students. Built on the synergy between “best practices” in Black Studies and “promising practices” for extended learning programs this project creatively established a nurturing and culturally grounded learning environment, which appeared to garner positive results in a short period of time. Although the program experienced particular problems with retention, according to the literature this is an endemic issue with extended learning programs for underachieving African-American students.

Upon entry into the “circle of learning” students were literally taken on a journey into the discovery of self knowledge. Aligning the walls, tables, and presentation boards, this station was decorated with pictures of African and African-American role models, vibrant colors of African cloth, African games (e.g.—Mankala) and puzzles-- also Afrocentric reading materials available for perusal. Students were called to attention and energy channeled through the Project PYRAMID mantra: “If I believe, I can achieve.” Throughout the program sessions, students took turns leading the class in the mantra and developed their own leadership styles.

Curricular lessons and student activities were conducted, therefore, in a cultural context that was designed to produce receptivity to the African centered holistic model, and to influence long range aspirations for pursuing a college education and to cultivate a commitment to the African-American community. All students who matriculated through the program were issued certificates to officially certify participation in this college preparatory experience, which can be cited as “community service” on their future college applications.

### B. Contributions of Project PYRAMID Products

#### Structural Level

**Reflective Analysis Report (Program Manual)**  
**PROJECT PYRAMID Video**  
**PROJECT PYRAMID Powerpoint**  
**PROJECT PYRAMID Mousepad**

#### Student Development Level

**PROJECT PYRAMID Curriculum**  
Volume One: “Affective” Curriculum  
Volume Two: “Cognitive” Curriculum

#### Instructional Level

**Curriculum Training Manual.**

#### Parent Involvement Level

**Monthly Assessment Report**  
**PROJECT PYRAMID Drumbeat**  
*Pathways Newsletter*

### C. Future Implications of Afrocentric Holistic Instructional Model

Project PYRAMID has demonstrated that its Afrocentric holistic instructional model has positive future implications. Although there are some areas that need strengthening previously discussed (e.g. parent involvement), this does not negate the viability of the model. Instead it points to the substantial potential of the model, which succeeded despite the obstacles encountered in the pilot study. It should be noted that all programs encounter unexpected obstacles, and the test of viability is whether the problem solving strategies are sufficient enough to overcome these obstacles and continue program operations. Another indicator pointing to positive future implications is the commitment of the staff, most of whom have expressed a desire to continue with the program. In addition, future implications suggest that the program would become even more effective, because there is a model with a curriculum that has proven to be effective on the target population. In other words, the substantial energy that went into developing the curriculum during the pilot study would be shifted to other program areas, like solving the retention problem. Afrocentric math and science internet resources for pre-college students were invaluable. Consequently, creating a website for disseminating and providing access to the Project PYRAMID holistic instructional model and the curriculum would be the ultimate contribution to knowledge and action.

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\* No other information given. However, the book was written in 1933.

## APPENDIX CONTENT

PROJECT PYRAMID CURRICULUM COMPONENTS

STUDENT PRODUCTS FROM “CIRCLE OF LEARNING” STATIONS





COMMENDATIONS TO THE PROJECT PYRAMID STAFF



## PROJECT PYRAMID CURRICULUM COMPONENTS

The curriculum is divided into four components, corresponding to the learning stations in the “circle of learning.” Curricular lessons were geared towards the California Mathematics Content Area Standards for middle school students. Math lessons were divided into weekly curricular modules for each month, organized around cooperative learning groups (i.e. Yoruba- 6<sup>th</sup> graders or Nubians 7<sup>th</sup> –8<sup>th</sup> graders), in order to provide academic options for addressing the varied skill levels.

### PROJECT PYRAMID CURRICULUM PROFILE

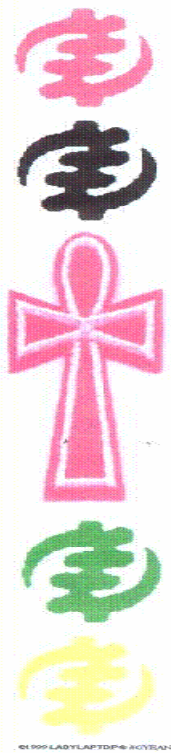
“CIRCLE OF LEARNING” STATION	MONTH ONE GOAL/ OBJECTIVE	MONTH TWO GOAL/ OBJECTIVE	MONTH THREE GOAL/ OBJECTIVE	MONTH FOUR GOAL/ OBJECTIVE
<b>ACHIEVEMENT VALUES TRAINING STATION</b> <b>[EMPOWERMENT]</b>  	<i>Understanding Culture and Mathematics- African Legacy in Math and Science</i>	<i>Understanding the Mathematics of Socio-political Knowledge- African-Americans Continuing the Legacy in Math and Science</i>	<i>Understanding the Politics of Mathematical Knowledge- Discerning the Politics Behind Curricular Omissions of African Foundations of Algebra</i>	<i>Understanding the Politics of Knowledge- African Roots of Geometry: Building For Eternity</i>
<b>TEACHING STATION</b> <b>[MATH]</b>  	<i>Number Sense and Operations- Overview of African Roots of Math and Science</i>	<i>Number Sense &amp; Algebra Readiness- African-American Contributions to Math/Science</i>	<i>Algebra and Functions- African Number Patterns &amp; Origins of Algebra</i>	<i>Geometry and Measurement- African Fractals &amp; Geometry of the Pyramids: Building for Eternity</i>
<b>ACADEMIC REINFORCEMENT STATION</b> <b>[SCIENCE]</b>  	<i>Introduction to the Scientific Method- The Eye: Epitome of Observation</i>	<i>Performing Data Analysis- Our Universe- Key to African Epistemology</i>	<i>Conducting Scientific Experiments- Studying the Earth’s Magnetic Field &amp; Cycles of the Moon</i>	<i>Documenting Scientific Conclusions- Sun Dial Experiment &amp; Movements of the Sun</i>
<b>DEMONSTRATION PRODUCT STATION</b> <b>[AFRICAN MARKETPLACE]</b>  	<i>Apply Mathematical Reasoning Through Arts &amp; Crafts- Framing African Math/Science Contributions</i>	<i>Apply Mathematical Reasoning Through Arts &amp; Crafts- Workings of the Solar System</i>	<i>Apply Mathematical Reasoning Through Arts &amp; Crafts- Charting African Number Patterns</i>	<i>Apply Mathematical Reasoning Through Arts &amp; Crafts- Pyramid- Building for Eternity</i>



ACHIEVEMENT VALUES TRAINING STATION  
HALL OF WASET EXHIBIT OF STUDENT SCHOLARSHIP



◉ Theme: "Know Thyself" ◉



TEACHING (MATH) STATION  
PROJECT PYRAMID STUDENT MATH PRODUCTS



△ Theme: Pyramid-Building △





★ Theme: "Reach For the Stars" ★



✂ Theme: African Marketplace ✂



## COMMENDATIONS TO THE PROJECT PYRAMID STAFF

I wish to express my deepest appreciation for  
the contribution, conscientiousness, and commitment  
of the Project PYRAMID staff for their untiring dedication.

Your expertise and creativity helped to bring this curriculum to fruition.

*Rehema Gray, Ph.D.*

*Principal Investigator / Project Director*

