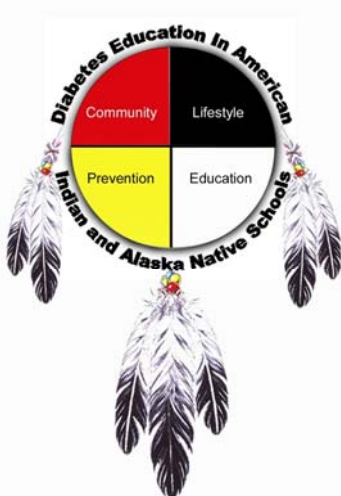
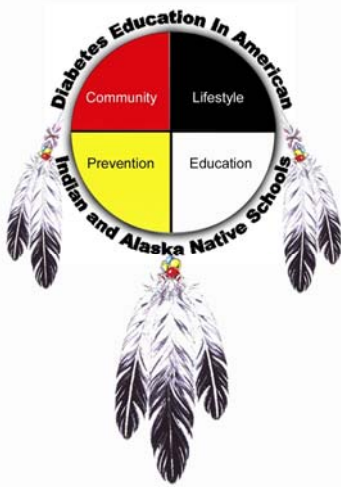


Phase II Evaluation Report

Diabetes-Based Science Education Program For Tribal Schools June 2005



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A Process Evaluation of a K-12 Diabetes-Based Science Education Program for Tribal Schools

INTRODUCTION

The Diabetes-Based Science Education in Tribal Schools (DETS) program is a cooperative effort among the NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and Office of Science Education (OSE) with the Centers for Disease Control and Prevention (CDC), the Indian Health Service (HIS), and eight Tribal Colleges and Universities (TCUs). The partners in this collaboration are developing a K-12 diabetes-based education program for use in tribal schools throughout the United States. Program development includes collaboration among multiple TCUs; integration of tribal cultures and science education within the context of diabetes; involvement of family and community; incorporation of the daily experience of American Indian and Alaska Native children with diabetes in their communities; inclusion of Tribal Elders and other significant community groups in program development within the schools; and dissemination of the program to schools throughout Indian Country.

The stated revised goals of the project are to (1) help Tribal children to understand about diabetes, its complications and ways to reduce the risk for its onset [original goal 1: reduce the morbidity and mortality related to diabetes and its complications by helping tribal children understand and take more responsibility for controlling and managing their own diabetes]; (2) enhance K-12 Tribal students' understanding and appreciation of direct and indirect effects of scientific discoveries on diagnosis, treatment, and control of diabetes [no change from original goal 2]; and (3) encourage Tribal children to enter health science professions [no change from original goal 3]. During the process of this evaluation the goals were improved to reflect the overall purpose of DETS; these adjustment will be documented in this report. The six key questions addressed in this study are:

1. Are lesson development efforts adequately aligned with the three program goals?
2. Are lesson development efforts following the 5E template for each of the three curriculum development subcommittees (K-4, 5-8, 9-12)?
3. Has a systematic Field Test Plan with timeline been developed and agreed upon?
4. Have pilot tests been conducted for each lesson, and have the changes called for by the pilot tests been made to the lessons?
5. Has an integrated, authentic assessment strategy been planned and implemented to measure the effectiveness of lessons?



6. What has been the overall impact of the pilot test of the curriculum on student achievement and attitude toward diabetes within the context of science and health education?

The purpose of this report is to provide process analysis of the DETS Curriculum Project relative to these six key questions. In this regard there are five data sources used to analyze the six key questions: 1) lesson specific DETS Pilot Test Evaluation forms; 2) web-based DETS Pilot Test form generalized across several lessons; 3) discussions at quarterly DETS face-to-face meetings; 4) External Advisory Committee (EAC) meeting and review (December 2004); 5) site visits to 10 classrooms across four TCUs.

Lesson specific DETS Pilot Test Evaluation forms were distributed to Principal Investigators (PIs) via email and at quarterly meetings. This form was developed by the external evaluator in collaboration with the eleven members of the DETS Evaluation Subcommittee. The form covered the *clarity* of lesson goals, objectives, vocabulary, material lists, and local, state and national standards. There were overall questions about student participation, content, ease-of-use and lesson difficulty. A copy of this form may be found in Appendix A.

The web-based generalized DETS Pilot Test Teacher Web Survey asks for overall ratings about difficulty of content, ease-of-use, level of engagement as well as written responses regarding strengths and weaknesses of lessons used. This survey focused on *all* the pilot lessons that a teacher tested rather than a particular lesson. A copy of this form may be found in Appendix B.

As external evaluator Dr. Coulson has attended six quarterly DETS Steering committee meetings in Fort Peck Montana (September 2003), Bellingham Washington (January 2004), Lawrence Kansas (May 2004), Rocky Boy Montana (September 2004), Albuquerque New Mexico (January 2005) and Leech Lake Minnesota (May 2005). Dr. Coulson presented evaluation material at each meeting as well as actively engaged in curriculum development discussions during these meetings. The 2005 evaluation PowerPoints may be found in Appendix C.

In December of 2004 Dr. Coulson attended the External Advisory Committee meeting in Denver as one of the four DETS presenters. Presentations were given to the EAC from the four DETS subcommittees: 1) K-4; 2) 5-8; 3) 9-12; 4) Evaluation. The EAC evaluation PowerPoint may be found in Appendix D.

Classroom site visits began in September 2004. Classrooms were visited in schools associated with Stone Child College, Montana (i.e., Box Elder and Rocky Boy), Southwestern Indian Polytechnic Institute, New Mexico (i.e., Dulce and Santo Domingo), Haskell Indian Nations University, Kansas (i.e., Royal Valley) and Leech Lake Tribal College, Minnesota (i.e., North School and Cass Lake). Some classes were teaching a DETS lessons, others had



completed teaching a DETS lesson and finally some classes were preparing to teach a DETS lesson.

FINDINGS

QUESTION 1: Are lesson development efforts adequately aligned with the three program goals?

Overall the three DETS curriculum subcommittees (i.e., K-4; 5-8; 9-12) have aligned lesson development with the three program goals. At the start of Phase II (i.e., April 2004) the three DETS goals were stated as follows:

1. help Tribal children to understand about diabetes, its complications and ways to reduce the risk for its onset;
2. enhance K-12 Tribal students' understanding and appreciation of direct and indirect effects of scientific discoveries on diagnosis, treatment, and control of diabetes;
3. encourage Tribal children to enter health science professions.

In April of 2004 goal 1 as stated above was revised from its original form: "reduce the morbidity and mortality related to diabetes and its complications by helping tribal children understand and take more responsibility for controlling and managing their own diabetes". Goals 2 and 3 were not revised at the beginning of Phase II and remained as they were originally stated at the outset of the project in 2002.

Throughout 2004 curriculum writers focused on the education details of diabetes appropriate for their grade level. While the 5E model was broadly followed and the three goals as stated above were kept in mind, lesson development developed content details. For the K-4 curriculum writers content detail tended to be associated with behavioral activities which might prevent type II diabetes. In this regard lesson activities often were related to physical exercise or identification/preparation of healthy foods. At the 5-8 level, curriculum content focused on the eight body systems (i.e., circulatory, digestive, nervous, respiratory, endocrine, excretory, musculo-skeletal, reproductive). At these grade levels more of the science of diabetes was introduced (e.g., glucose, insulin, pancreas) and two curriculum strands emerged: science strand and the community health strand. At the 9-12 level, content has been clearly divided into a science strand and a community health strand.

In December of 2004 the External Advisory Committee (EAC) met in Denver to review DETS curriculum development thus far. After presentations by the four DETS subcommittees



(i.e., K-4; 5-8; 9-12; Evaluation), members of the EAC focused their reviews on a single fully developed lesson from each of the three subcommittees. In contrast to looking at one lesson, the external evaluator examined the content of curriculum CDs received in January 2005 (K-4 and 5-8) and September 2004 (9-12). The lesson documents on these CDs were examined for their connection to the three DETS goals. These results are summarized in Table 1 below. Table 1 is followed by a brief summary of the EAC Review relative to DETS goals. Table 1 would be of "historical interest" for two reasons: a) the data (i.e., lesson documents) has been superseded by more recent lesson development; b) the EAC Review, as will be seen below, served to refocus not only lesson development efforts but the revision of the three goals as well.

Table 1
Relationship of Early Lesson Development to Three DETS Goals*

	Goal #1: help Tribal children to understand about diabetes, its complications and ways to reduce the risk for its onset	Goal #2: enhance K-12 Tribal students' understanding and appreciation of direct and indirect effects of scientific discoveries on diagnosis, treatment, and control of diabetes	Goal #3: encourage Tribal children to enter health science professions	Lesson document did not refer to one of the three DETS goals
9-12 Lessons (9/04) [N=7 documents]	57%	43%	14%	0%
5-8 Lessons (1/04) [N=7 documents]	43%	86%	14%	0%
K-4 Lessons (1/04) [N=13 documents]	15%	0%	15%	85%

* Sum of percentages across a row can exceed 100% due to possible multiclassifications

Table 1 shows that for the 9-12 and 5-8 lesson documents available on CD on or before September 2004 covered all three DETS goals. The least coverage appears to be for goal three (*"encourage Tribal children to enter health science professions"*). For K-4, it is appropriate that there would be less coverage of goal two, which focuses on the diabetes of science. The low percentages for K-4 for goals one and three may be due simply to the lack of explicit reference to a particular goal. For example, there are lessons within K-4 on the prevention of disease through traditional diet. While many of these lessons may have referred implicitly to diabetes, the lack of explicit reference to diabetes resulted in a check mark in the right-most column (i.e., no explicit reference to DETS goals). The 9-12 low percentage (i.e., 43%) for goal two was unexpected, especially since the 9-12 curriculum plans to have a strong emphasis on the science of diabetes.



However, because the reviewed lesson documents were in their early stages of development (i.e., September 2004 or before), it is also likely that KBOCC (i.e., health strand) had developed more of its lessons than NWIC (i.e., science strand).

QUESTION 2: Are lesson development efforts following the 5E template for each of the three curriculum development subcommittees (K-4; 5-8; 9-12)?

The evidence for question 2 comes from a review of lesson CDs provided at the Steering Committee meetings (i.e., Rocky Boy, September 2004 and SIPI, 2005), as well as a discussion of the December EAC Review. Table 2 below summarizes the findings from the lesson CDs.

Table 2
Relationship of Early Lesson Development to 5E Model*

	No evidence of 5E Model	Partial use of 5E Model	Full use of 5E Model
9-12 Lessons (9/04) [N=7 documents]	14%	0%	86%
5-8 Lessons (1/04) [N=8 documents]	63%	0%	37%
K-4 Lessons (1/04) [N=11 documents]	22%	0%	78%

* Sum of percentages across a row can exceed 100% due to possible multiclassifications

Table 2 shows that a substantial amount of the early curriculum development has employed the 5E model. For K-4 and 9-12 a majority of the documents reviewed (i.e., lesson documents where it would be appropriate to incorporate the 5E model) in fact did include the 5E model. In contrast, only about one third of the 5-8 lesson documents included appropriate references and use of the 5E model. Upon examination of document dates, the 9-12 and K-4 materials were more recent, whereas the 5-8 materials tended to be older, and went as far back as August of 2003. The fact that the 5-8 documents were older may explain the lower use of the 5E model. It was not until the spring of 2004 that the Steering Committee reviewed and required that all lesson formats be standardized on the 5E model. Also, some of the 5-8 lesson development was not available at the time of the review.

The general conclusion at this point in the curriculum development process is that the curriculum writing teams are making an effort to apply the 5E model format to their lessons. While this is not the case for every lesson nor is it applied thoroughly in all cases, where it is applied, the 5E model has been used during lesson development efforts. Before moving onto



question #3 (*Has a systematic Field Test Plan with timeline been developed and agreed upon?*) the EAC Report will be summarized relative to its conclusions on the use of the 5E model.

The main criticism from the December 2004 EAC Report is that the 5E model has been applied inconsistently and occasionally inappropriately. The most likely reason for this would be that the DETS *conceptual framework is loose*. For example, one reviewer described the 9-12 curriculum lesson that was reviewed as a daunting list of content lacking focus on fewer, more important concepts. Another reviewer said that the 5E model was inappropriately applied because it lacked alignment with the goals of the current phase of the instructional model. Unlike the review above which was broadly based on all available documents, the EAC review applied the AIM (Analyzing Instructional Materials) scoring rubric to a *single lesson*. Basically this scoring process applies a *percentage* to four areas: 1) content; 2) work students do; 3) assessment; 4) work teachers do. In all cases DETS scored highest on content. However the lesson reviewed from each of the three curriculum subcommittees lacked sufficient integration to 5E formatting *and* the three DETS goals to score high.

The main consequence of the EAC Report for the DETS curriculum development effort was to assert curriculum integration by re-articulating *enduring understandings* relative to the three DETS goals. This focusing process involved revisiting key concepts in workshops and meetings in order to produce a brief, central document called *DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives*. A substantial draft of this document was presented at the May 2005 Steering Committee meeting, approximately four months after receiving the EAC Report. The significance of this Goals document is that it provides a central development metaphor, *Health is Life in Balance* and, equally important, limits the amount of content by focusing on *enduring understandings*. While additional content beyond enduring understandings would be available, content will focus on enduring understandings, which in part have emerged from meetings as well as AIM/Understanding by Design (UbD) workshops conducted in early 2005.

The clarity of this new curriculum development direction was reflected in two documents circulated at the May 2005 Steering Committee meeting at Leech Lake: 1) UbD worksheet; 2) PowerPoint relating 5E to UbD. The first document starts by stating the DETS goal that is to be written about in a lesson. This is then followed by a place to write out *understandings* ("students will understand that") and *essential questions*. Stage 2 of this worksheet requires that the developer write out *assessment evidence* (e.g., performance tasks) for desired understandings. The third stage of this worksheet asks the developer to write out the *learning activities* for the lesson. This UbD worksheet is from ASCD and Grant Wiggins and Jay McTighe, and may be found in Appendix E. The second pertinent handout from the May 2005 Steering Committee meeting relates the 5E model to aspects of UbD for each of the 5 Es (i.e., *engage, explore, explain, elaborate, evaluate*); this may also be found in Appendix E.



The clear conclusion at this point in the curriculum development process is that DETS is moving from a conceptual framework that has been loose in terms of content and pedagogical model to a more focused goals document and scope-and-sequence. The evidence shows that both the three DETS goals as well as a pedagogical model (i.e., the 5Es) have been present all along. However the early assembly of the lessons has been awkward and fragmented. Subsequently (i.e., early 2005) the curriculum subcommittees have oriented their writing activities based on workshops and meetings toward integrating content with fewer concepts called *enduring understandings*, and applied the 5E model in a deeper manner by bringing approaches from Understanding by Design (e.g., attending to assessment in the early stages of development rather than after the lesson is completed).

It is worth emphasizing that as a result of work on the *DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives* document, the metaphor *Health is Life in Balance* has become a touchstone for generating enduring understandings and the three DETS goals originally presented in Table 1 above have been modified slightly. Table 3 contrasts the goals as presented in Table 1 with the current, revised DETS goals.

Table 3
Evolution of DETS Goals

Goal 1	Goal 2	Goal 3
2004: Help Tribal children to understand about diabetes, its complications and ways to reduce the risk for its onset	2004: Enhance K-12 Tribal students' understanding and appreciation of direct and indirect effects of scientific discoveries on diagnosis, treatment, and control of diabetes	2004: Encourage Tribal children to enter health science professions
2005: <i>Increase the understanding of health, diabetes and maintaining life in balance among American Indian/Alaska Native students</i>	2005: <i>Increase American Indian/Alaska Native students' understanding and application of science and community knowledge about health, diabetes and maintaining balance, and of the processes of development of that knowledge</i>	2005: <i>Increase interest in science and health professions among American Native/Alaska Native youth</i>

QUESTION 3: Has a systematic Field Test Plan with timeline been developed and agreed upon?

During 2005 a broad and systematic Field Test Plan with timeline has been developed with input first from the Evaluation Subcommittee and second with input from the Steering



Committee. The monthly evaluation conference calls at the end of 2004 and the early part of 2005 included discussions about DETS evaluation design and specific instrumentation.

Design

The design discussion focused on the use of pre and post achievement tests and attitude surveys, level of implementation and the possibility of volunteer comparison groups for some of the sites. For the Beta Test pre and post measurements (i.e., achievement and attitude) will be scheduled for October 2005 and December of 2005. For the Field Test pre and post measurements will be scheduled for January 2006 and May of 2006. The *Instrumentation Section* below describes the development of the achievement and attitude measures more specifically.

The pre and post measures will look at student gain as a function of level of implementation. An *implementation composite* is being developed. This composite measure will consist of data from site visits from the external evaluator, reports from the principal investigators at each of the TCUs and an end-of-semester survey distributed to teachers through the PIs via the web. The implementation measure will permit the sample to be divided into *high* implementers and *low* implementers such that a two way analysis of variance (i.e., one within subject variable, and one between subject variable) would look at gain and its interaction with implementation. Where comparison groups (voluntary by TCU site) are available, additional two way ANOVAs will be conducted using the implementation composite as a covariate (i.e., two way ANCOVA).

The relationship between achievement and attitude will be examined with a multiple regression framework. Achievement will function as a dependent measure with attitude, implementation level as well as school characteristics (e.g., percent Native American; size of school) serving as independent variables.

Where non-commensurate variables need to be compared for high vs low levels of implementation effect sizes will be calculated and graphed. Effect sizes are standardized scores and in this regard are scale independent.

Finally data patterns will be studied using a variety of graphical techniques. For example, box-and-whisker plots which show the median, interquartile range, range and outliers can effectively be used to visually describe the differences between DETS classes and comparison classes, or between low implementing classes and high implementing classes.

These general design considerations were presented at the quarterly meeting of the DETS Steering Committee at Leech Lake in May 2005. The PowerPoint slides from this presentation by the external evaluator are provided in Appendix C.



Instrumentation

Throughout Phase II of the DETS Project instrumentation has been described, developed and used. Currently there are two instruments in use, and several instruments under development. Appendix F (separate document) is the *Instrumentation Binder* which provides details on instrumentation in use as well as instrumentation under development. In addition, the *Instrumentation Binder* contains examples of ancillary forms necessary to conduct Beta Testing and Field Testing (e.g., letter of commitment; photo and video release forms).

The two instruments in use are the *DETS Pilot Test Lesson Evaluation Form* (Appendix A) and the *DETS Pilot Test Teacher Web Survey* (Appendix A). Throughout the Pilot Test phase (which ends June 2005) of the DETS Project, teachers at TCU schools who have been testing DETS lessons in the classroom have submitted these forms to their PIs, who in turn have forwarded the forms to the external evaluator for aggregation and analysis. During the Pilot Test phase nine separate TCU reports were provided by the external evaluator to the TCU PIs. These nine reports are summarized later in this document and are available in their entirety in Appendix H (a separate document).

There are four instruments under development. The first set of measures focus on student achievement *at the unit level*. The purpose of these unit level achievement measures is to provide program level impact data vis-a-vie the design discussed earlier rather than classroom level information that teachers might use. These measures will be a combination of multiple choice (80%) and short answer questions (20%). Development of the achievement items (both multiple choice and short answer) follows the development of units. As writers complete the writing of each lesson they also produce two multiple choice items and one short answer item which are submitted to the external evaluator through the TCU PI. Thus far for the K-12 DETS curriculum approximately 50 multiple choice and 20 short answer questions have been submitted. Once units are finalized and all questions are received (i.e., August 2005) the pre and post achievement tests will be assembled by the evaluator. These tests will be developed at the *unit level*. These unit level assessments will also contain a few items (approximately 10%) from state tests (e.g., Texas) and national tests (e.g., NAEP). The *Instrumentation Binder* contains examples of unit outlines and sample test items.

The second set of instruments under development are the student attitude surveys. These surveys ask students about their perception of the activities within the lessons, how well they liked the activities and their general attitude toward science. Also within the survey are several questions concerning interest in a career in science. The general attitude toward science survey will be conducted with the pre-post design framework (i.e., October and December of '05; January and May of '06). The attitude survey questions associated with a particular unit will be administered as close to the completion (i.e., post test) of the associated unit as possible along with a repeat of the general attitude questions. The *Instrumentation Binder* contains a third round development draft of this student attitude survey, which was also presented at the January



2005 Steering Committee meeting at SIPI in Albuquerque New Mexico. Final attitude instrumentation will be completed in August 2005 in time for review at the September 2005 Steering Committee meeting and distribution to schools in October 2005.

The third instrument is the web-based *Teacher Participation Survey*. The survey will be the main basis for calculating the *fidelity of implementation composite*. The prototype of this survey was developed in April of 2005 and presented at the May 2005 Steering Committee meeting at Leech Lake, Minnesota. The survey contains questions on frequency and duration of participation in teaching the DETS curriculum. Some of the questions ask the teachers directly to rate their own success in implementing the DETS curriculum. These direct self report responses on implementation can be weighted (either high or low) when calculating a *fidelity of implementation composite*. The reason to weight these particular ratings lower relates to the practical possibility that when asked directly, teachers may overstate their success at implementation. It will also contain questions on availability of DETS materials in the classroom such as manipulatives, posters and models associated with diabetes. The combination of actual DETS related materials in the classroom, frequency/duration data, and self report on implementation success will help constitute a reliable and stable composite measure of *fidelity of implementation*. This measure can also be disaggregated in order to study particular aspects of implementation (e.g., fidelity as materials in the classroom). Finally this way of measuring fidelity of implementation is consistent with the research literature in that it focuses on its quantitative aspect (e.g., frequency and duration of lessons) and qualitative aspect (e.g., teacher's self report).

The fourth instrument is the *DETS observational protocol*. This instrument is based on protocols developed by Horizon's Inc at Research Triangle, and BSCS in Colorado Springs. The purpose of the *DETS observational protocol* is to provide direct observational data on classroom environment. Is the classroom "constructivistic"? Are the teachers following the 5E DETS lesson plan? Are the students acting as scientists? This observational measure will help triangulate fidelity of implementation to the extent that the observational data is similar to implementation data from the web-based *Teacher Participation Survey*. This validity check will be useful during the final data analysis phase in the summer of '06. The instrument is complete and ready to use during site visits. A copy of the *DETS observational protocol* may be found on pages 16 and 17 of the *Instrumentation Binder*.

Scheduling and Timeline Binder

Scheduling site visits and distribution of instrumentation can be problematic for a large national curriculum project. In that regard a descriptive binder was presented and disseminated at the May 2005 quarterly Steering Committee meeting. The purpose of this *Scheduling and Timeline Binder* (see Appendix G - a separate document) is to describe schedule, contact information and timelines associated with implementing the evaluation design described above. This document contains useful information for PIs regarding data requests from the external



evaluator as well as a project data timeline to assist PIs in anticipating and managing these data requests. Table 4 on the next page shows the external evaluation timeline from the summer of '05 through the summer of '06.

Table 4 - Outcome Evaluation Timeline
DETS Steering Committee Meeting at Leech Lake, MN
May 19, 2005

	Spring 2005	Summer 2005	
What Teams Do	<p>Send Doug:</p> <p>a. Multiple choice and short answer test items (about 2-3 per lesson)</p> <p>b. Unit/lesson topic outlines</p>	<p>Send Doug:</p> <p>a. School participation list: overall size of school; type*; number of classes and number of students within classes for each participating grade level; extent of participation for each classroom**</p> <p>b. Timeline for participation for each classroom</p>	<p>Send Doug:</p> <p>a. Recommended times for site visits</p>
What Doug Does	<p>Doug creates:</p> <p>a. Unit level pre and post test achievement assessments</p> <p>b. Unit level pre- and post attitude assessments</p>	<p>Doug creates:</p> <p>a. Sampling plans for administering achievement and attitude pre and post tests</p> <p>b. Test administration schedule for Field Test (September 05 to June 06)</p>	<p>Doug creates:</p> <p>a. In coordination with PIs and schools, site visit schedule is setup for Field Test</p>



Table 4 (continued) - Outcome Evaluation Timeline
DETS Steering Committee Meeting at Leech Lake, MN
May 19, 2005

Academic Year 2005 – 2006 (Field Test)	Summer 2006
<p style="text-align: center; color: blue;">Teams:</p> <p>a. Administer achievement and attitude pre- and post-tests and surveys</p> <p>b. Tests and surveys mailed to Doug</p>	
<p style="text-align: center; color: blue;">Doug & Colleagues:</p> <p>a. Site visits</p>	<p style="text-align: center; color: blue;">Doug:</p> <p>a. Analyzes achievement, attitude and observational data</p> <p>b. Produces Field Test evaluation report.</p>

Table 4 divides the evaluation activity between what the three curriculum teams do through their respective PIs, and the concurrent responsibilities of the external evaluator. In April of 2005 this timeline was discussed and agreed to by the Evaluation Subcommittee. Subsequently this timeline was presented and discussed at the May 2005 quarterly Steering Committee meeting. It



is expected that by the end of the summer of 2005 (i.e., August 31st), the external evaluator will have received achievement test items, unit outlines and a list of participating classrooms for the Fall '05 Beta Test. Table 5 below provides an example of how to list participating schools.

Table 5 - Example Site Matrix
Participants in Royal Valley School District

Name	Contact information	School	Grade level(s)	Class size	Approx. % Native American	Approx. % Non-Native
Rebecca Long *	Longb@rv337.k12.ks.us	Royal Valley Elementary	Kindergarten	23	26%	74%
Lisa Hickman **	blfcd@yahoo.com	Royal Valley Elementary	Kindergarten	22	31%	69%
Tracey Koch *	kocht@rv337.k12.ks.us	Royal Valley Elementary	2 nd	22	23%	77%
Jackie Riggles **	rigglesj@rv337.k12.ks.us	Royal Valley Elementary	2 nd	22	27%	73%
Belinda Brandt *	brandtb@rv337.k12.ks.us	Royal Valley Elementary	1 st	23	13%	87%
Melissa Dibbern **	dibbernm@rv337.k12.ks.us	Royal Valley Elementary	1 st	22	14%	86%
Jan Shenk **	shenkj@rv337.k12.ks.us	Royal Valley Elementary	1 st	23	30%	70%
Nancy Mergen **	mergenn@rv337.k12.ks.us	Royal Valley Elementary	4 th	21	33%	67%
Annette Roach *	aroachusd337@yahoo.com	Royal Valley Elementary	3 rd	19	32%	68%



Notes for Table 5:

** These teachers tested lessons first during the Pilot phase. They will also be asked to field test all the lessons for their respective grade level.*

*** These teachers tested the lessons second during the Beta phase after changes had been made from the Pilot phase. They will also be asked to use programmatic evaluation tools on a control group that receives “regular classroom instruction.”*

Note: these teachers worked on teams (by grade level) to write lessons designated for them by the K-4 scope and sequence. They have been working on developing lessons for the last 3 years. The lessons focus on diabetes prevention with an emphasis in either Health or Life Science respectively. They have received continuous professional development on the inquiry based model of lesson design.

This level of specificity is critical for establishing a representative sampling plan which would include a sufficient number of schools and classrooms across the sites. As can be seen in Tables 4 and 5, based on materials received from writers through the PIs by August 2005, the external evaluator will have completed all four sets of instruments as described here (i.e., achievement measures; attitude surveys; end-of-semester teacher web survey; observational protocol), as well as identified specific schools across the regions of the 8 TCUs for site visits.

A good summary of the scheduling and timeline activities for this report is provided in Table 6 below. This table focuses on the pre-post aspect of the evaluation design illustrating the "what" (i.e., pre/post achievement and attitude measures) and the "when" (i.e., October and December of '05 for the Beta Test, and January and May of '06 for the Field Test). Table 6 also shows the target number of items for the achievement tests and attitude surveys.



Table 6 - The “What-and-When” Matrix
Pre-Post Beta/Field Test Assessment Schedule
May 19, 2005

WHAT	WHEN	K – 2	3 – 4	5 – 6	7 – 8	9 – 10	11 – 12
Achievement Assessments	Oct '05	Behavioral Checklist	<u>10 Items</u> 8 Multiple Choice 2 Short Answer		<u>20 Items</u> 17 Multiple Choice 3 Short Answer		
	Dec '05						
	Jan '06						
	May '06						
Attitude Assessments	Oct '05	Behavioral Checklist	# of lessons + 10 general attitude toward science items + 2 open-ended items				
	Dec '05						
	Jan '06						
	May '06						

Tables 4 through 6 and the description of the purpose and use of these tables illustrate that a systematic Field Test plan with a timeline has been developed, presented and accepted by the DETS Steering Committee.

QUESTION #4: Have pilot tests been conducted for each lesson, and have the changes called for by the pilot tests been made to the lessons?

Pilot test data was solicited by PIs from the teachers associated with each of the three curriculum writing teams. Initially teachers were asked to complete the *DETS Pilot Test Lesson Evaluation Form* developed by the external evaluator. These paper forms were sent via the PIs to the external evaluator for summarizing. By September 2004 a *DETS Pilot Test Teacher Web Survey* was available. Data from these surveys (both paper and web-based) are summarized in nine reports which were distributed at the January 2005 and May 2005 Steering Committee



meetings to the PIs at the associated TCUs. These nine reports are reproduced in the separate Appendix H. Note that Appendix H also contains four additional reports based on data received too late to be integrated into the Phase II DETS Evaluation Report. Table 7 below summarizes the number of lessons that have been piloted tested through May 2005.

Table 7
Number of Pilot Test Lessons Taught and Evaluated

	K-4	5-8	9-12
Fort Peck	11	1	
SIPI		53	
Haskell	25		
Keweenaw Bay	2	1	
Leech Lake		4	
Stone Child		9	

Table 7 reflects the number of pilot test lessons that were actually evaluated with either the *DETS Pilot Test Lesson Evaluation Form* or the *DETS Pilot Test Teacher Web Survey*. An unknown number of additional lessons were tested but not evaluated with one of these forms.

There are two objective indications that lessons were improved as a result of the pilot testing phase of the DETS Project. First, the pattern of statistics (Table 8) from the evaluation forms for three TCUs improved from the January 2005 TCU pilot reports to the May 2005 TCU pilot reports. Second, one TCU (i.e., Haskell) taught some lessons, collected data, then taught these lessons again to different students in the same school. As will be seen below the pre-post gains for the changed (i.e., improved) lessons are greater than for the original lessons.

Table 8 summarizes the major components of the pilot evaluation form. First, there is an average percent improvement from January 2005 to May 2005 for the eight lesson components: 1) lesson goal; 2) lesson objectives; 3) vocabulary; 4) material list; 5) National Science Standards; 6) American Indian Standards; 7) state standards; 8) assessment. Second, the statistical indicators for teachers and students improve from the first report to the second report.



Table 8
Pilot Changes from January 2005 to May 2005

	K-4	5-8	9-12
Average percent change on <i>very clear</i> rating for 8 lesson components		SIPI: +7.4%	
For Teachers (% change)			
Teacher friendly	Haskell: 78% -> 100% (28% more said "more teacher friendly" - easier to use) Fort Peck*: 100% -> 100%	SIPI: 100% -> 82% (18% fewer said more teacher friendly)	
Confusing		SIPI: 75% -> 5% (70% fewer said confusing)	
Too complicated		SIPI: 0% -> 14% (14% said more complicated)	
For Students (% change)			
Too easy	Haskell: 0% -> 0% Fort Peck: 0% -> 0%	SIPI: 0% -> 2% (2% more said it got easier)	
Just right	Haskell: 75% -> 100% (25% more saw it as "just right") Fort Peck*: 100% -> 89% (11% fewer saw it as "just right")	SIPI: 100% -> 72% (28% fewer said it was "just right")	
Too difficult	Haskell: 25% -> 0% (25% fewer said it was "too difficult") Fort Peck*: 0% -> 11% (11% more said it was "too difficult")	SIPI: 0 -> 26% (26% more said it was "too difficult")	

* Fort Peck January 2005 pilot survey data is based on 1 respondent; other responding sites (i.e., Stone Child and Leech Lake) only complete forms for one of the reporting periods ending either January '05 or May '05



Without including Fort Peck (i.e., only one survey for the January '05 report), the cell change percentages are approximately evenly split between indicating a positive change (e.g., more seeing the lessons as teacher friendly) and a negative change (e.g., fewer teachers seeing the lessons as teacher friendly). The most interesting change happened at SIPI where fewer (i.e., 18%) saw the lessons as teacher friendly but a full 70% fewer said that the lessons were confusing. The probable reason for the lessons appearing less teacher friendly would seem to be associated with the fact that those teachers who saw the lessons as *more complicated* in the second May 2005 report increased by 14%.

The narrative remarks from teachers for the 9 pilot reports (i.e., 5 reports in January 2005 and 4 reports in May 2005) provide additional data on the impact of the pilot testing on lesson development. For Fort Peck the pilot narrative data show that the materials were very engaging, active and hands-on. However, some of the vocabulary (e.g., *homogenized*; *pasteurized*) was too difficult for the K-4 level, and materials were not available at the time that the lessons were taught.

To improve: *"Only to have all the materials readily available for use at the time of the time of the lessons."*

"The strengths I noticed were the wide ranging activities ..."

"The assessment was particularly easy to use as it was hands-on for the children."

Initially (i.e., January 2005) the SIPI narrative responses focused on "time". Among the few comments available, teachers commented that they needed more time for the lessons, which were too long for the time allotted. In the May 2005 report the SIPI narrative responses focused more on materials. Specifically the overheads were good, practical and usable, however there needed to be more overheads. The visuals were seen as sufficiently successful that teachers wanted more of them. The pedometers were engaging and helped focus the data collection activity (i.e., accumulating 10,000 steps), and the students liked the opportunities to engage in a compare and contrast activity with the two stories (Cinderella and Turkey Girl). Once again the main problem seemed to be having enough materials, especially the books. Sufficient time also emerged as an issue.

"I feel that all the books recommended ... should be provided."

"At times it was hard to get some of the required materials, if it could be provided that would be great."

"The length of the lessons is too long for the time frame suggested."

"More visuals."



"The students liked the stories ..."

"Overheads were great. These lead into a discussion. We were able to use the pretest to coordinate with the overheads. Pretest was clear."

"Hands-on materials (pedometers) of interest to the students."

"Good data collection activity. A good lead-in to scientific data collection in conjunction with science experiments."

For Haskell throughout the January 2005 and May 2005 the main concern with the pilot lessons was that they were too long for the time allotted. As the lessons were tested one teacher expressed concern that while diabetes was a very important topic, they (the teachers) were under a lot of pressure to have their curriculum strictly adhere to state requirements (i.e., only teach content that are on state tests). The Haskell teachers who pilot tested DETS lessons felt that their students enjoyed the lessons, that the lessons were very engaging, hands-on and written at a level appropriate to their students.

"Some of the lessons are too long, they require more than one day to cover all the material."

"All of the lessons so far will need an adjustment on length of time to complete from 30-45 minutes, to 45 to 60 minutes"

"High interest for first graders. My students have enjoyed the lessons."

"Students are interested in topics. Activities are interesting."

There was Stone Child pilot data (5-8 grade levels) from 2004, which was published in their January 2005 report. Generally teachers who piloted tested these early lessons indicated that the vocabulary was excessive and that the lesson objectives were not addressed. One comment suggested that an introductory diabetes lesson be developed. A few teachers cited specific activities that they liked.

"Students loved the modified digestion experiment."

"Lesson objectives not addressed."

"Vocabulary excessive."



On the survey in the January 2005 Stone Child report teachers indicated that the lesson objectives were rated *clear* only 56% of the time, with the remaining 44% of the 9 teacher ratings falling below *clear* (i.e., *unclear* or *very unclear*). In this regard specific content associated with diabetes and science in general was rated as insufficient (~77%). It appears that at this early stage in the curriculum development process, the lessons seemed confusing to the teachers. This assessment might indicate that the lessons did not have sufficient support material or that teachers did not have "professional development" inservice to use the lessons properly.

The Keweenaw Bay data also came from the January '05 report, but the three surveys were for lessons at the K-4 level, not the 5-8 level as it was for Stone Child. Overall the teachers felt that lesson objectives were *very clear* (100%). Sixty seven percent said that the lessons were *teacher friendly*, with one teacher saying that the lessons were *confusing* (33%). All of the surveys indicated that the lessons were *just right* for the students. The narrative comments described in detail the active hands-on nature of the activities, stressing the science as inquiry components. The main limitation was the size and developmental mix of the students who went through the outdoor activities. There were 35 students ranging from first to fourth grades participating.

"Large student age span made it challenging to keep the student participation, length and complexity 'just right' for all learners but effort was made to keep students engaged. I think in a classroom it will be more manageable."

The Woodlands Wisdom/Leech Lake data (grades 4 through 6) came from the May '05 report. Although only 25% of the teachers said that the lessons were *very clear*, three of the four teachers (i.e., 75%) said that the lessons were *teacher friendly*. All of the teachers said that the lessons were *just right* for the students. Based on the narrative comments, the main issue was that the length of the classes in many cases was only 30 minutes, making it problematic to complete a DETS lesson. The lessons, however, were easy to understand, especially the vocabulary. Lessons (e.g., wild rice) were considered very relevant to the lives of the students.

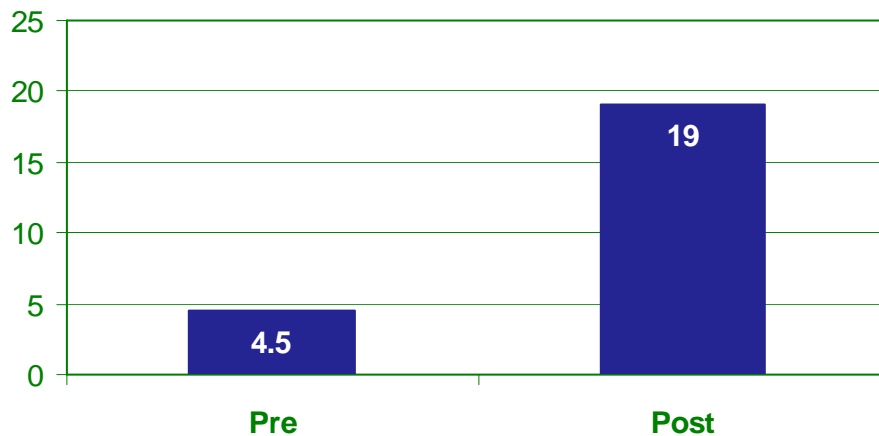
These 9 pilot reports (see separate Appendix H) show a curriculum development process that has resulted in lessons that vary in quality from the teachers perspective. [*Pilot test reports 10, 11 and 12 are also included in this appendix but not reported here because the data was received too late (i.e., June 6th, 2005) for inclusion in this report. This data was not "late", it simply was collected too late for analysis in the Phase II DETS Evaluation Report.*] Often aspects are correctable such as providing all the hands-on material in a timely fashion, or make adjustments to the class size and age mix. In a few instances more professional development inservices would be helpful. Site visits (discussed below) indicated that lessons were usually presented in isolation, as single entities, separate from the natural flow and sequence of a fully articulated curriculum. This in turn created problems for both teachers and students alike to make quick adjustments to new topics and vocabulary. Finally the EAC review in December of 2004 slowed lesson development while the three curriculum subcommittees refocused their



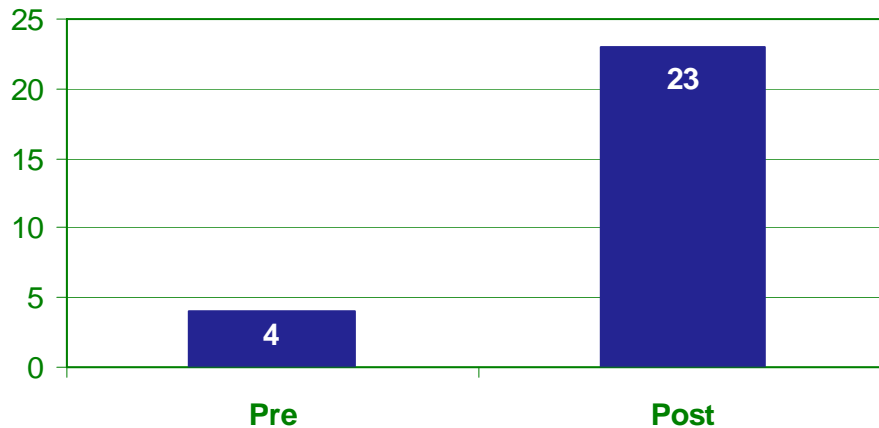
efforts on the broad metaphor of *health is life in balance* and the fewer and more focused *enduring understandings*. The pilot data presented thus far shows a process adjusting itself. That is, the pattern of the comments in the May 2005 pilot test reports showed a qualitative improvement in content and depth of comments relative to the January 2005 pilot test reports. Next we turn to some quantitative indicators that lesson adjustments based on pilot data have improved the lessons.

The final piece of evidence comes from a series of pre-post tests conducted on lessons at the Haskell pilot school, and the replication of the pre-post tests on additional students using a revised lesson. This data was contained in the May 2005 pilot report to Haskell. The Haskell teachers that taught a pilot lesson also administered lesson-level pre/post tests to their students. On the basis of test performance, reaction of students and teachers to the pilot lesson, the lesson was improved. Subsequently the lesson was taught to new students, and pre/post tests were readministered. Figures 1 through 4 below show the pre/post test results for the original lesson and for the revised lesson (i.e., Pilot 1 and Pilot 2).

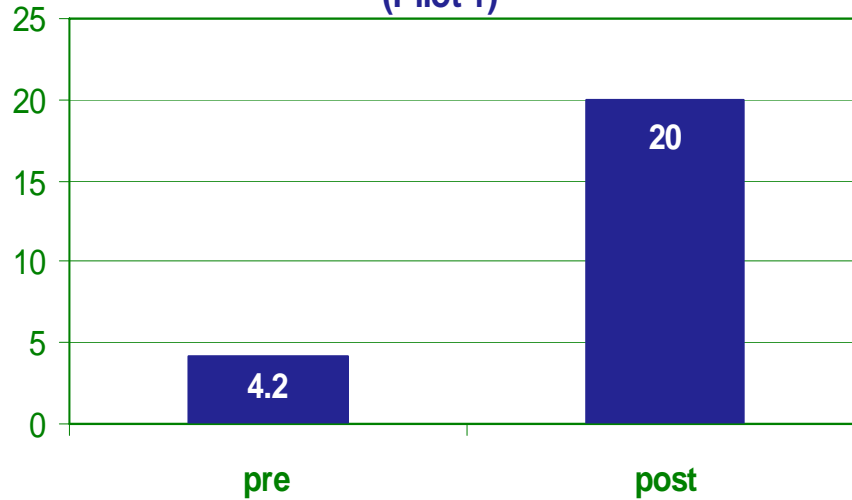
**Figure 1: 1st Grade Life Science
(Pilot 1)**



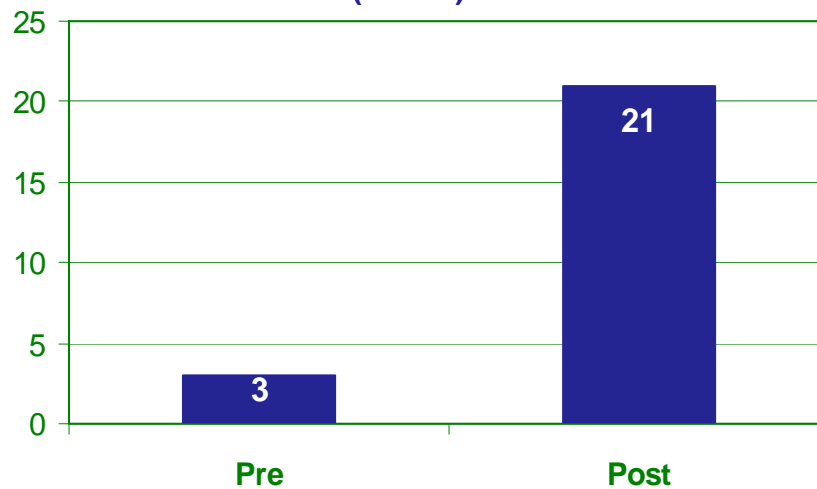
**Figure 2: 1st Grade Life Science
(Pilot 2)**



**Figure 3: 2nd Grade Life Science
(Pilot 1)**



**Figure 4: 2nd Grade Life Science
(Pilot 2)**



As can be seen in these figures not only are there greater gains from pre to post in "pilot 2" (i.e., the revised lesson), there are also stronger post test results for "pilot 2" when compared to "pilot 1". These quantitative findings further confirm that not only have changes been made to pilot lessons as a result of testing the lessons but that these changes have been effective.



In summary, the qualitative narrative from the *pilot test lesson evaluation forms* show a curriculum development process that is improving as one reads the comments from the five January 2005 Pilot Test Reports to the four May 2005 Pilot Test Reports. Furthermore Table 8 shows that the quantitative indicators for K-4 are improving as well. For example, the "*teacher friendly*" percentage improved from 78% to 100% from January 2005 to May 2005 for one reporting TCU. However, Table 8 also shows some of the quantitative indicators at the 5-8 going down. For example, the "*teacher friendly*" percentage moved from 100% to 82% from January 2005 to May 2005. In addition 14% more teachers said that the curriculum was more "*complicated*", and 26% of the pilot testing teachers said it was more "*difficult*" for the students. While it is not possible to give a precise reason for the difference between the K-4 and 5-8 statistics, it is believed that the bulk of the 5-8 lessons arrived and were tested after January 2005, and thereby creating a situation in which the arriving curriculum materials were simply overwhelming. Finally, the pre-post tests for pilot lessons and revised pilot lessons clearly show that lesson development and changes are improving the curriculum. In all cases the curriculum is being tested and adjusted as the development process continues.

QUESTION 5: Has an integrated, authentic assessment strategy been planned and implemented to measure the effectiveness of lessons?

The three curriculum subcommittees are using the 5E pedagogical model for developing and formatting lessons. Furthermore the subcommittees are using the *understanding by design* approach by Grant Wiggins and Jay McTighe. The *understanding by design* framework and the 5E template insures that classroom assessment strategies will be integrated and authentic.

The 5E pedagogical model developed by BSCS Inc progresses through five stages: *engage, explore, explain, elaborate* and *evaluate*. Classroom assessment is conducted at the evaluate stage in the model. At the evaluate stage the learner puts theory into practice, shows evidence, engages in self critique and develops a perspective on what is next. The main characteristic of assessment at this stage is that it is active and hands-on. In addition the progression to the evaluate step is seamless in that there is very little perceived difference between the learning activities and the assessment activities. In this sense the assessment is authentic relative to what is happening during the teaching of the lesson. For the lesson template there is little real distinction between activities during the engage, explore, explain and elaborate stages, and the evaluate stage.

In the book *Understanding by Design* Wiggins and McTighe present a "backwards curriculum design" which starts with the key question:

"What is worthy and requiring of understanding?"



For DETS, what is worthy and requiring of understanding would be content (i.e., cultural, scientific and career related content) that relates to the central metaphor: *Life is Health in Balance*. The follow-on key question in Wiggins and McTighe relates to authentic assessment. Their second key question is:

"What is evidence of understanding?"

Wiggins and McTighe decompose "understanding" into six categories: 1) explanation; 2) interpretation; 3) application; 4) perspective; 5) empathy; 6) self-knowledge, and then describe these six categories with these respective qualifiers: sophisticated, profound, masterful, insightful, mature and wise. Thus, for example, assessment (of understanding) should exhibit *sophisticated explanation or insightful perspective*.

The "backwards design" focuses on developing assessment first by working backwards from evidence of understanding. These are "big concepts", and as such strive for authentic assessment. The DETS evaluate activities strive to be hands-on, performance activities and thereby more authentic. For example at the K-4 level an evaluate assessment is described this way:

***"Evaluation:** Teacher and/or student generated scoring tool or rubrics. Students assess their knowledge, skills and abilities. Activities permit evaluation of student development and lesson effectiveness. This section also reflects on the objectives written in the beginning of the lesson plan.*

Authentic assessment of learning will be evidenced by participation in activities, contributions to discussions, and completion and presentation of food wheels."

These K-4 "participation rubrics" are described (as above) but undeveloped in the DETS curriculum materials as of January 2005. It should be noted that curriculum development efforts between January 2005 and May 2005 focused not on specific lessons but on scope-and-sequence and the *Mission, Purpose, Goals, Concepts and Objectives* document as a response to the EAC review in December 2004.

At the 5-8 level the evaluate activities were also authentic. While the lessons reviewed were not fully formed in terms of the 5E model, these lessons (e.g., walking; pottery) had elements of authentic assessment in the strong behavioral components. Specifically the lesson section labeled *"Outcomes and Indicators of Success"* employed behavioral standards such as: *"teachers observe students drinking water instead of sodas"* or *"Are the students willing to share their information on diabetes with other students, friends and parents? Are they participating willingly in the activity day?"*



At the 9-12 level the evaluate activities were also highly participatory. For example, one rubric was given for oral presentations:

***"Diabetes: Diabetes in Native Communities
Prevention in Diabetes***

Rubric To Be Used to Grade Your Oral Presentation

Grading Criteria for Qualitative Oral Presentation (100 Point Test Grade)

You will be graded according to introduction and closing, eye contact, visuals, voice and pacing."

Another 9-12 evaluate activity was partly described in this manner:

"Through the class discussion students should be able to articulate their current or initial understanding or knowledge about the causes of diabetes.

Students will be asked to verbally reflect upon their qualitative research assignment and share their thoughts in class."

These evaluate examples from the materials developed by writers on the three curriculum subcommittees illustrate the fact that curriculum development, particularly through January 2005, have focused on hands-on, participatory rubrics for the evaluate activities. This approach to assessment is authentic in that it seeks to establish that students *understand* the material rather than simply showing memorization of facts. Although the evaluate activities are based on concepts of authentic assessment, the actual authentic assessment activities for the most part are still nascent. This circumstance is largely attributable to the impact of the December 2004 EAC review, which stressed the importance on focusing on a few key concepts (i.e., enduring understandings) and thereby develop a briefer yet broader K-12 scope-and-sequence document. Consequently curriculum development during the early part of 2005 (i.e., from January 2005 to May 2005) focused on big picture issues rather than specific lessons and lesson components such as evaluate activities.

QUESTION SIX: What has been the overall impact of the pilot test of the curriculum on student achievement and attitude toward diabetes within the context of science and health education?

The pilot test phase of the DETS curriculum ends June 2005. While additional pilot testing of curriculum material will occur during summer sessions, the data from these sessions will be included in later reports, and not in this *June 2005 Phase II Report*. Furthermore, the December 2004 EAC review refocused the efforts of the three curriculum writing teams from lesson development and testing to a comprehensive scope-and-sequence document (i.e., the *DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives* document). The more systematic beta testing of the curriculum materials is scheduled



to begin in September 2005. The research up to this point has focused on content and format of individual lessons. However one TCU collected pre-post achievement data *at the lesson* level. These pre-post test results provided preliminary results on the impact of pilot lessons on achievement only. At this point there is no attitude data available. Attitude data will be collected during the beta test phase of the project which starts in September 2005.

Earlier in this document Figures 1 through 4 on pages 21 and 22 demonstrated not only impact on achievement from pre-test to post-test, these figures also showed that revised pilot lessons resulted in greater change from pre to post tests, and also higher post-tests on "pilot 2" (i.e., second pilot) when compared to "pilot 1" (i.e., first pilot). Figures 5 through 12 below (also based on data from Haskell) follow similar strong pre to post changes for several pilot tested lessons.

Figure 5: Meat and Dairy - class #1

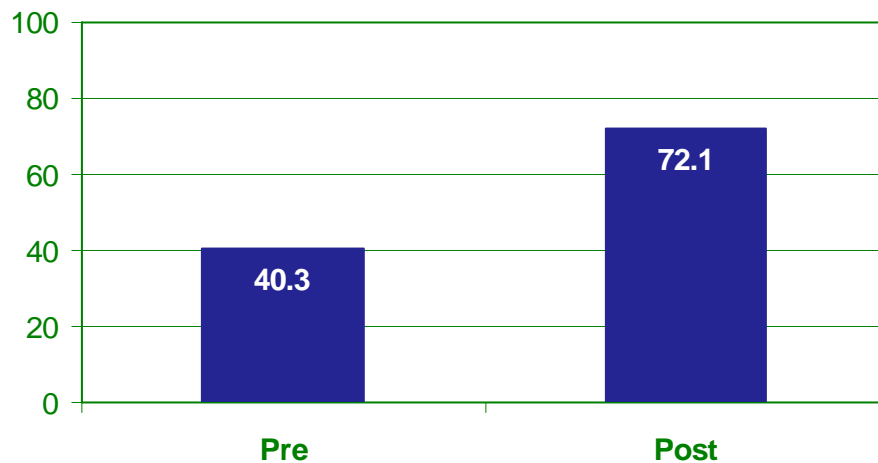


Figure 6: Bullying

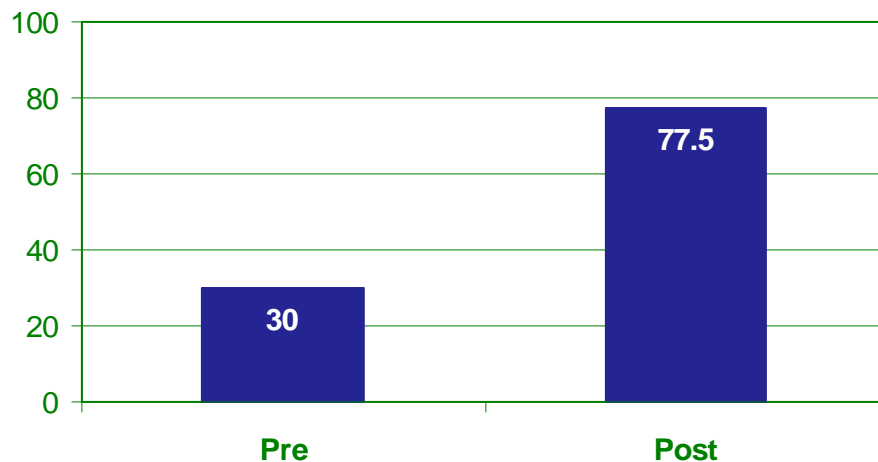


Figure 7: Meat and Dairy - class #2

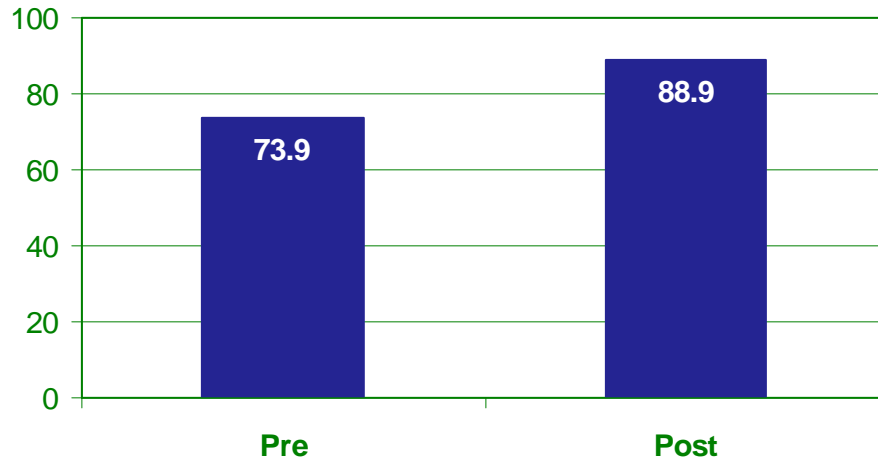
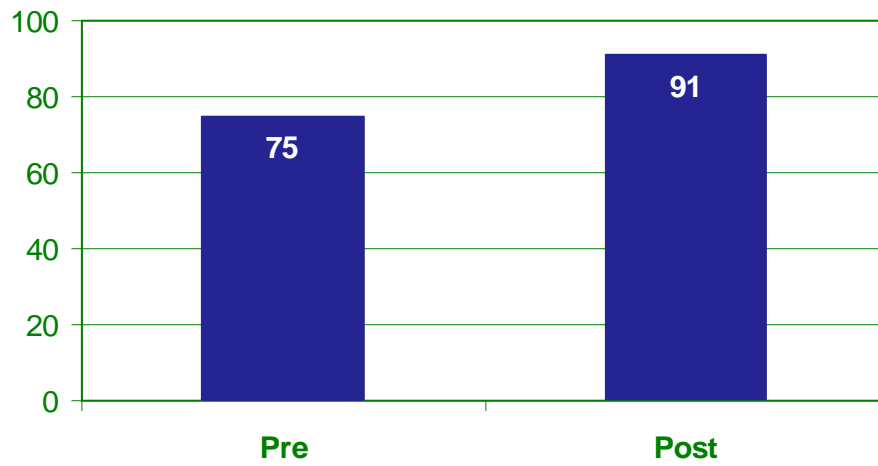
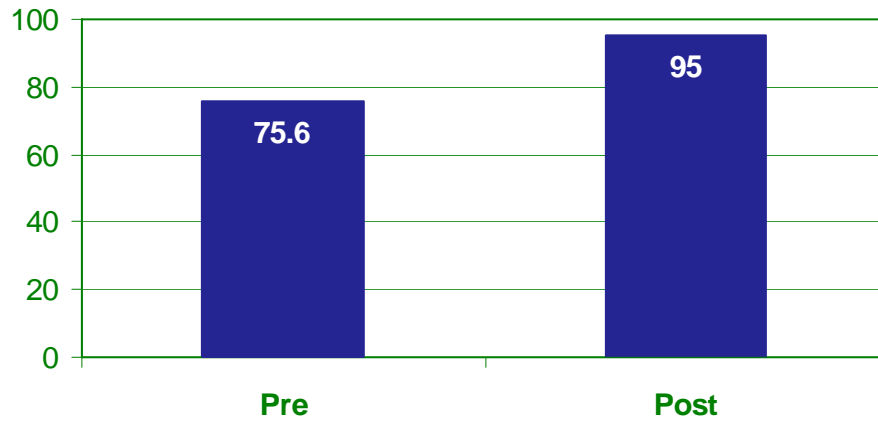


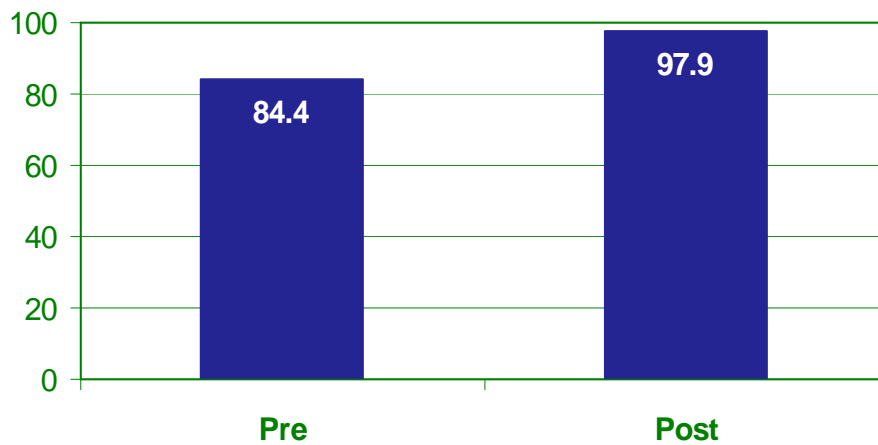
Figure 8: Healthy Living - class #2



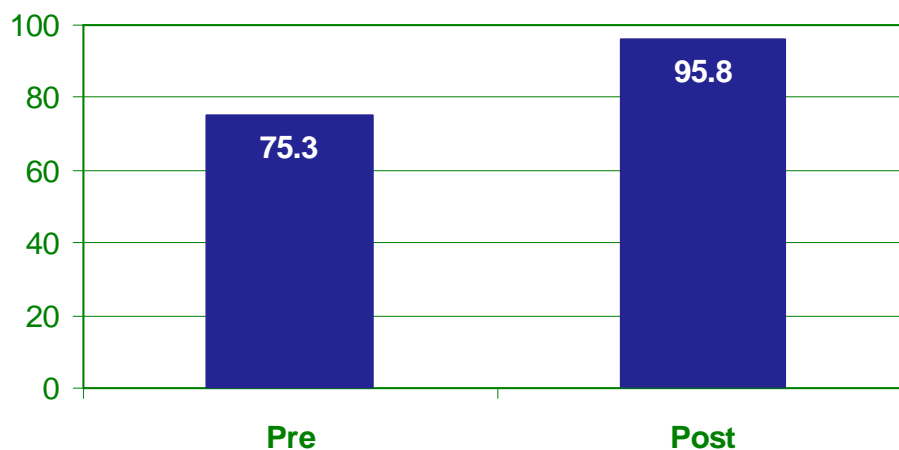
**Figure 9: Making Healthy Choices
class #1**



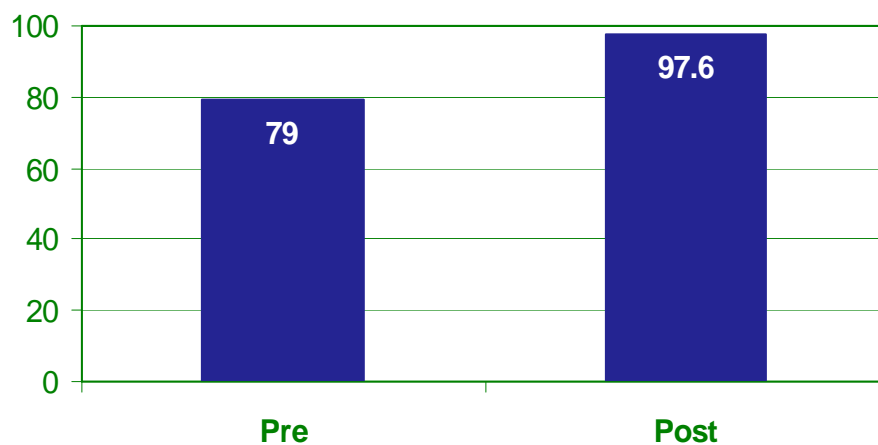
**Figure 10: Making Healthy Choices
class #2**



**Figure 11: Diabetes Food Needs
class #1**



**Figure 12: Diabetes Food Needs
class #2**



With the exception of *Making Healthy Choices - class #2* (Figure 10) all pre-post comparisons were statistically significant. Furthermore the pre-post pattern for all twelve DETS pilot lessons showed improvement.

Site Visits

Ten classrooms at four TCUs were visited during the pilot test phase. The four TCUs are: Stone Child (September 2004); SIPI (January 2005); Haskell (April 2005) and Leech Lake (May 2005). Teaching schedule conflicts of the external evaluator prevented a site visit to Keweenaw Bay in June 2005.

At Stone Child two classes were visited. The Box Elder Middle School class was 7 students. That class was interrupted twice by a fire drill. A DETS lesson was not scheduled for that day. At Rocky Boy Middle School the teacher introduced the concepts of insulin and glucose and went over the function of the pancreas and the definition of diabetes. The DETS lesson concluded with students being asked to illustrate the pancreas in the context of diabetes. After the lesson the external evaluator and teacher met for 15 minutes to discuss the lesson. The teacher initially engaged the students with a concept map of the pancreas in the body system. Students were not only attentive, but the closing evaluate activity (i.e., illustrate the pancreas) was completed in a conscientious manner without rote copying from available classroom materials. This attention to the DETS lesson is illustrated in the three photos below.



During the
and external
curriculum



lesson debriefing both the teacher
evaluator agreed that more *lead-up*
materials regarding the scope-and-



sequence of the diabetes lessons would be helpful to the students. The sudden introduction of diabetes material was confusing to the students. Future lessons would include more preview and *lead-up* material.

Three classrooms were visited at SIPI. The first was at Dulce Middle School, about a three hour drive north of Albuquerque. During this classroom visit, one of the DETS curriculum writers introduced a DETS art lesson. This lesson focused on how pottery is made and the notion of vessel and what can be put into it. The traditional *Water Jar Baby* story was the engage activity. There was not enough time to include an evaluate activity. Although it was clear that in this 13 student middle school classroom it was not "cool" to listen to the teacher (especially among the boys), the external evaluator observed several of the boys actively answering questions about the story after it was read. At one point two of the boys were engaging in a subtle "tug-of-war" with a piece of paper on the desk surface between them, and by all appearances, not paying attention. However, during the question-and-answer time after the *Water Jar Baby* story had been read aloud by the teacher, one of these two boys eagerly sought to answer questions posed by the teacher. Also, it is worth noting in one of the photographs below that one of the male students is drinking bottled water instead of a soda. Furthermore there is a water bottle dispensing machine in the school's foyer, without the usual soda machines. After the 50 minute class the art teacher (i.e., curriculum writer), and the regular teacher met with the external evaluator to discuss the DETS lesson. Clearly this particular lesson was engaging for the students, particularly the traditional *Water Jar Baby* story. The lesson lacked however sufficient time for contrast-and-comparison work as well as opportunities to draw relationships between the *Water Jar Baby* story and the body as vessel notion (i.e., the diabetes portion of this particular art unit). The class period ended abruptly without making connections with diabetes content.



The second SIPI classroom to be visited was a middle school class in language arts at Santo Domingo. The class of 14 was in their second or third day with this particular DETS lesson that focused on two stories: *Turkey Girl* and *Cinderella*. Once again the students appeared engaged by both stories, whose themes were that one can rise above one's circumstances and achieve a better life for oneself. The question-and-answer time after the stories were read (partly by the students as well as the teacher) was lively and participatory. There was not a rushed feeling as students had the opportunity to compare and contrast aspects of these two engaging stories. Unlike the first class at Dulce, here there was adequate time allowed (i.e., two to three class periods) to get through all the components of the lesson. The photos below show a few scenes from this second SIPI classroom.



The third SIPI classroom visited was also at Santo Domingo. Unlike the first two classes at Santo Domingo, this third class was a presentation of art and healthy living choices with displays of student work. Also, about 12 members of the DETS Steering Committee attended this presentation. First, five middle school students gave a short "speech" on their accomplishments in art and experience with diabetes. Afterwards the students posed in front of a mural that they had completed and subsequently shared their works of art (e.g., paintings, clay pottery) with the DETS visitors. Also, a display of traditional healthy foods was created. Although shy at first, it is clear from observing this presentation and from the photographs below that the students were extremely proud of their art works and involvement in the pilot test of the DETS curriculum.



Three classrooms were visited at Haskell's Royal Valley Elementary School. While these classes were not doing DETS lessons during the site visit, there was evidence of the DETS curriculum in hallway displays (i.e., living healthy) and from brief meetings with teachers who showed the external evaluator Excel spreadsheets used to collect pre-post lesson-level data during the pilot testing. Based on meetings with the school principal and superintendent, this site was very involved with pilot testing the DETS curriculum. Specifically, Royal Valley teachers regularly assessed their DETS lessons (see Figures 1 through 12 above) and provided this data to the Haskell DETS coordinator who in turn shared this data with the external evaluator. Overall the school environment was positive as evidenced by the positive messages observed throughout the school. The Haskell site visit also involved meeting with a Tribal Elder of the Prairie Band Potawatomi Nation, and the videographer on the Haskell campus. The Haskell coordinator (non Native American) was well versed in the pilot test research requirements as well as the tribal histories of the region.



At Leech Lake two classrooms were visited. The first classroom was not actively pilot testing DETS lessons, however this classroom was supplied with classroom posters and manipulatives associated with diabetes. Poster messages focused on well-known athletes and movie stars that successfully lived with diabetes. Other classroom material that was observed included displays which tangibly showed various organs (e.g., pancreas) that are involved with diabetes (see photos below). The external evaluator also visited *Bugs-O-Nay-Ge-Shig* School (K-12), and attended the Monday morning opening ceremony. The second classroom consisted of about 21 middle students. The teacher led an open-ended critique and analysis of the results of a diabetes survey. Students were asked to explain and elaborate on the survey's findings read aloud by the teacher. Although the students appeared engaged, there were no visuals such as graphs or other materials (apart from a copy of the actual survey) associated with this lesson. While the teacher was enthusiastic and was able to keep the attention of his class, the lesson appeared to be unplanned and ad hoc. The principal provided site visitors with a tour of the school, which had a "pod" (by subject areas such as music) layout.



**PRIMA BALLERINA
MARIA TALLCHIEF**

- Born in 1925
- Proud of her Osage heritage
- Lived in Fairfax, OK & Los Angeles, CA

A refined professional, **Maria Tallchief** left Los Angeles at the age of 17 and auditioned in New York City. She joined the Ballet Russe de Monte Carlo and quickly rose to the status of featured soloist.

In 1953 President Eisenhower named Maria Tallchief Woman of the Year.

Dancing, leaping, and jumping are activities that can help prevent diabetes.

**Jim Thorpe
1888-1953**

THUNDER BOLT

Understanding Food Labels

One of the ways to be sure that you have the right nutrients in your diet is to check food labels. The information on the label is organized in a way that is easy to understand and use. By knowing how to use the label, you can quickly find the number of calories per serving as well as the number of grams of each nutrient in the food.

The Nutrition Facts label includes a daily value for each nutrient. This helps you maintain a healthy diet. For example, if you eat a food that has 10% of the daily value for a nutrient, you are getting a good amount of that nutrient.

You will find the percentage of total fat, sodium, and total sugars in the food. This is because dietary fiber seems to have many health benefits. It always appears on the label.

Other food nutrients include vitamins A, C, and E, calcium, and iron.

Risks of Poor Nutrition

Increases the risk of heart disease and stroke

High cholesterol and high blood pressure are two major risk factors for heart disease and stroke. Poor nutrition can lead to high cholesterol and high blood pressure.

Increases the risk of certain cancers

High intake of red and processed meats, and low intake of fruits and vegetables, can increase the risk of certain cancers.



SUMMARY

Six key questions are addressed in this Phase II Report on the development process of the DETS curriculum. These questions are:

1. Are lesson development efforts adequately aligned with the three program goals?
2. Are lesson development efforts following the 5E template for each of the three curriculum development subcommittees (K-4, 5-8, 9-12)?
3. Has a systematic Field Test Plan with timeline been developed and agreed upon?
4. Have pilot tests been conducted for each lesson, and have the changes called for by the pilot tests been made to the lessons?
5. Has an integrated, authentic assessment strategy been planned and implemented to measure the effectiveness of lessons?
6. What has been the overall impact of the pilot test of the curriculum on student achievement and attitude toward diabetes within the context of science and health education?

Process data was collected from lesson-level paper and web-based teacher surveys as well as during site visits and quarterly meetings. There were site visits to ten classrooms across four TCUs: Stone Child, SIPI, Haskell and Leech Lake. A fifth site visit to Keweenaw Bay in June 2005 could not be scheduled because of conflicts with the external evaluator's university teaching schedule. During the Pilot Test Phase nine reports based on the lesson paper and web surveys were disseminated to the appropriate TCUs at the quarterly meetings in January 2005 and May 2005. The tenth, eleventh, twelfth and thirteenth pilot reports were produced from June 2005 data but not analyzed here; this data will be included in the September 2005 report. In total, data collection efforts yielded 123 paper surveys (44 of which will be incorporated into the September 2005 report) and 35 web surveys (10 of which will be incorporated into the September 2005 report). The thirteen Pilot Test Phase reports are contained in Appendix H of this document. Table 9 below summarizes the distribution of returned surveys (i.e., number of pilot lessons examined [some lessons were tested more than once]).



Table 9 - Distribution of Survey Returns by TCU, Report Date and Data Channel

Report Dates➤	January 19, 2005		May 19, 2005		September 21, 2005	
	Feedback Form	Web Survey	Feedback Form	Web Survey	Feedback Form	Web Survey
1 Stone Child	9 (gr. 7)					
2 Fort Peck	1 (gr. 4 – 6)			3 (gr. K) 2 (gr. 1) 2 (gr. 2) 1 (gr. 3) 1 (gr. 4)		2 (gr. K)
3 KBOCC	2 (gr. 1 – 4) 1 (gr. 6)					1 (gr. 1)
4 SIPI	4 (gr. 8)		7 (gr. 5) 21 (gr. 6) 6 (gr. 6 – 7) 3 (gr. 7) 12 (gr. 8)		17 (gr. 6) 1 (gr. 6 – 7) 2 (gr. 6-7-8) 3 (gr. 7) 14 (gr. 7 – 8) 6 (gr. 8) 1 (Special Needs)	
5 Haskell	2 (gr. 1) 3 (gr. 2) 2 (gr. 3) 2 (gr. 4)			1 (gr. K) 5 (gr. 1) 3 (gr. 2) 4 (gr. 3) 3 (gr. 4)		4 (gr. K) 2 (gr. 1) 1 (gr. 2)
6 Cankdeska Cikana						
7 Northwest Indian College						
8 Leech Lake			2 (gr. 4 – 5) 2 (gr. 5 – 6)			
TOTAL	26	0	53	25	44	10



In the earlier stages of lesson development writers tended to focus on content independent of the three DETS goals. Moreover, the direction of lesson development shifted after the December 2004 EAC review toward building a comprehensive K-12 scope-and-sequence document (i.e., "*DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives*"). As a consequence of this shift, the lesson content reviewed for this report was based on curriculum CDs distributed at the September 2004 and January 2005 quarterly meetings. Table 1 on page four shows that the least coverage appears to be for goal three ("*encourage Tribal children to enter health science professions*"). For K-4, it is appropriate that there would be less coverage of goal two, which focuses on the diabetes of science. The low percentages for K-4 for goals one and three may be due simply to the lack of explicit reference to a particular goal. For example, there are lessons within K-4 on the prevention of disease through traditional diet. While many of these lessons may have referred implicitly to diabetes, the lack of explicit reference to diabetes resulted in a check mark in the right-most column. The 9-12 low percentage (i.e., 43%) for goal two was unexpected, especially since the 9-12 curriculum plans to have a strong emphasis on the science of diabetes. However, because the reviewed lesson documents were in their early stages of development (i.e., September 2004 or before), it is also likely that KBOCC (i.e., health strand) had developed more of its lessons than NWIC (i.e., science strand).

It appears that in the earlier stages (i.e., before September 2004) of lesson development attention to goals was less critical than developing grade-level appropriate diabetes science and health content. Consequently the curriculum "spread-out" across content areas too much. The EAC review recommended that coherence be increased by focusing on a narrower content field driven by *enduring understandings*. For the most part this has been happening since the three curriculum teams have refocused their 2005 writing efforts not on lessons per se but on the *DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives* document. The success of this refocus on the conceptual framework of DETS will be the subject of the Phase III evaluation work during the Beta Test and Field Test phases of the evaluation process. At this moment DETS is following a process development strategy characterized by coherence, focus and rigor (three known characteristics of effective science programs). The coherence and focus derive from mapping *enduring understandings* as they are derived from the three DETS project goals. Process rigor derives from the external review process and the content rigor derives from the DETS Scientific Review Committee, which has been reviewing all the content accuracy of lessons before they are tested in the classroom.

From the data in this report the use of the 5E model appears to be successful (see Table 2 on page five). This finding contrasts somewhat with the finding of the AIM (Analyzing Instructional Materials) which found that the application of the 5E model was inconsistent and insufficient. However, the AIM process was only applied to *three* lessons (i.e., one for K-4; one for 5-8 and one for 9-12) during the December 2004 EAC review. On the other hand, by scanning all the lessons available on CDs, it appears that most developers made full use of the 5E model (see Table 2). The possible exception would be the 5-8 lessons. It must be noted,



however, that the 5-8 lessons which were available for review tended to be "older" (e.g., late 2003 and early 2004) and thereby developed before the DETS Project put a strong emphasis on using the 5E model as a lesson template.

A systematic Field Test plan has been developed. This plan has been discussed and reviewed by the Evaluation Subcommittee during its monthly DETS conference calls. In addition the Field Test plan as well as the Beta Test plan have been presented and accepted at the May 2005 Steering Committee quarterly meeting at Leech Lake. Additional language describing the solicitation and use of voluntary comparison groups is being developed over the summer of 2005. In addition to the development of the Field Test plan, a general timeline has been presented at the May 2005 quarterly meeting. Details regarding the plan as well as the timeline have been published and distributed in the document *DETS Scheduling and Timeline Binder*. An earlier binder called the *DETS Instrumentation Binder* contains the latest examples of instrumentation development for conducting a project-level evaluation. Examples include instrumentation for student achievement and attitude, a finished observational protocol, and a prototype teacher web-based survey to measure implementation fidelity. The importance of providing the external evaluator with lesson-level achievement test items as well as finished topic outlines (for measuring attitude) has been stressed in conference calls as well as at the quarterly steering committee meetings.

Some evidence of authentic assessment was found among evaluate activities. Clearly the curriculum writers are striving to create evaluate activities that are authentic (i.e., hands-on, active, participatory, cooperative, inquiry-based). However, lesson assessments (i.e., evaluate activities) are still nascent. A more complete examination of the extent to which the evaluate activities follow the guidelines of authentic assessment will occur during the Phase III evaluation work. In some cases (see pages 18 and 19) lessons were rated as less teacher friendly, which appeared to be because of extensive lesson detail. Also, several pilot test teachers urged that *more time* be allowed for any given lesson. Finally in some cases pilot testing preceded the availability of materials which caused some frustration among the teachers that were teaching the lesson.

From the available pre-post data it is clear that DETS is having an impact. All but one of the pre-post gains were statistically significant. Furthermore, the gains were stronger when the lesson was improved and taught a second time (to a different class). This impact data presented in Figures 1 through 12 are at the lesson level. During the Phase III evaluation process, a more systematic look will be taken at the *unit level*, rather than at the lesson level. Unit level data will be more generalizable given that they will represent more content and more participating classrooms across the school communities of the eight TCUs. The Field Test will be a more systematic replication of the Beta Test, adding further to the generalizability of the results.

Overall the evidence shows that the development of the DETS curriculum during the pilot phase of this project has resulted in an improving set of curriculum lessons and attending supporting materials. While successful in making improvements in Phase II, during Phase III the



DETS curriculum development process must show conceptual focus around its central metaphor (*Health is Life in Balance*), and the *enduring understandings* associated with the three DETS goals. This focus will tighten a sprawling set of content materials, making it easier for prospective teachers and schools to navigate and select lessons to replace parts of their existing curriculum. Furthermore, during Phase III attention paid to length of lesson (i.e., not too long), vocabulary level (i.e., not too difficult), cultural relevance (currently often very appropriate), and consistent pedagogical formatting (i.e., the 5E model), the DETS curriculum will emerge as a strong, practical and unique set of instructional materials for Native American as well as non-Native American schools across the country.



RECOMMENDATIONS

1. Maintain focus on the central metaphor: *Life is health in balance* and the three goals of DETS;
2. Link *enduring understandings* to this central metaphor *and* the three goals of DETS;
3. Align all lesson development to the three goals via UbD and the *DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives* document;
4. Focus lesson content on the *enduring understandings* contained in the *DETS - Diabetes Education in Tribal Schools: Mission, Purpose, Goals, Concepts, and Objectives* document;
5. Apply the 5E model to lessons as both a formatting template as well as a pedagogical guide for achieving a hands-on, constructivistic curriculum;
6. Conduct a peer review of all lessons using the AIM process at the September 2005 quarterly meeting paying particular attention to: a) lesson focus on enduring understandings (rather than all the details attending diabetes); b) time allotted for teaching each lesson (i.e., allot sufficient time to cover material); c) timely availability of resource books, overheads, inservices and other support material needed for teaching a lesson; d) 5E model used consistently through the K-12 curriculum;
7. Develop strong supporting materials that relate to professional development (i.e., pre-service and inservice), teacher guides and lesson video scenarios;
8. Design a visually stimulating and easy-to-use curriculum navigation tool (e.g., a revamped CDT tool) to allow prospective teachers to find out what are the best parts of the DETS curriculum that can *replace* parts of their existing curriculum. In this regard particular attention should be paid to providing a tight and focused conceptual framework via a teacher-friendly and visually strong scope-and-sequence document as well as via the recommended curriculum navigation tool;
9. Continue to "market" the curriculum through word-of-mouth channels at various national conferences, professional meetings and community meetings;
10. Plan a comprehensive marketing strategy which would include consistent art work and graphics, a teacher friendly scope-and-magnitude document (e.g., navigation tool) and sufficient professional development (with incentives).





Appendix A

For Phase II DETS Evaluation Report
June 2005

Pilot Test Lesson Evaluation Form

DETS Pilot Test Lesson Evaluation Form for Lesson: _____

How did it go? Please take a moment to complete this rating form on the main elements of the DETS lesson that you have recently test taught to your students. The survey is quick-and-easy to complete, and will provide the curriculum developers with a good sense of what is working and what needs to be improved.

Name: _____ School: _____ Grade: _____ Date of lesson: _____

Listed duration of lesson in minutes: _____

Actual duration of lesson in minutes: _____

The lesson components below were:	very clear	clear	unclear	very unclear
1. Lesson Goal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Lesson Objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Vocabulary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Material List	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. National Science Standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. American Indian Content Standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. State Standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall

9. Student participation was: ☐ low ☐ average ☐ high
10. Diabetes awareness content was: ☐ insufficient ☐ adequate ☐ excessive
11. Science content was: ☐ insufficient ☐ adequate ☐ excessive
12. For teachers lesson was: ☐ teacher friendly ☐ confusing ☐ too complicated
13. For students lesson was: ☐ too easy ☐ just right ☐ too difficult
14. Lesson length was: ☐ too long ☐ just right ☐ too short
15. Also, lesson was: ☐ other: _____

16. This lesson needs more: ☐ supporting materials ☐ inservice ☐ assessments
☐ other: _____

17. Briefly comment on lesson strengths: _____

18. Briefly comment on areas that need improvement: _____

Thanks!



Appendix B

For Phase II DETS Evaluation Report
June 2005

Pilot Test Web-Survey for Teachers

DETS Pilot Test Teacher Web Survey



Teacher Name:

Grade Level:

School:

State:

Background Data

A. How many DETS lessons have you taught during the Pilot Test Phase?

1

2

3

4

5

more than 5

B. About how many of your students participated in the DETS pilot lessons?

1 to 10

11 to 20

21 to 30

31 to 40

More than 40

C. Briefly list the *topics* and *names* of the DETS lessons that you taught.

Survey Questions

1. Overall, how would you rate the content of these lessons for your students?

too easy

just right

too difficult

2. Overall, which lesson components (e.g., goal statements, standards, materials list, vocabulary, cultural content, science content, assessments, etc.) were particularly effective and easy to use?

3. Overall, which lesson components (e.g., goal statements, standards, materials list, vocabulary, cultural content, science content, assessments, etc.) were particularly ineffective and difficult to use?

4. From your perspective were the lessons that you taught from the DETS curriculum adequately aligned with the National Science Standards?

yes no

Please briefly elaborate.

5. In general what have been the strengths of the DETS lessons thus far?

6. In general what areas of the DETS lessons that you taught need improvement?

7. Please take a final moment to provide us with a couple of overall ratings on your experiences with the DETS curriculum thus far.

a. From a teacher's perspective how easy-to-use is the DETS curriculum?

very difficult to use difficult to use easy to use very easy to use

b. Compared to other science curriculum that you have taught, how engaging for your students was the DETS curriculum?

very unengaging unengaging engaging very engaging

8. Please describe what kind of support or assistance you would need to fully implement the DETS curriculum.

Thanks for your help!



Appendix C

For Phase II DETS Evaluation Report
June 2005

Evaluation PowerPoint for January '05 and May '05 Quarterly Meetings

Wakaa!



Doug's Evaluation Presentation

- Instrumentation Binder
- What's needed from curriculum teams
- Timeline for the needed items

Instrumentation Binder (in your loose leaf binder)

- Issued in September 2004
- Re-issued in December 2004 for EAC meeting in Denver
- 6 forms ready to use
- 2 forms in development (attitude and achievement)

6 Forms Ready To Use

- Commitment Letter
- Photo Release
- Pilot Test Lesson Evaluation
- Teacher Web Survey on Pilot Lessons
- Observational Protocol
- Ethnographic Interview Schedules

2 Forms in Development

- Pre/Post Student Attitude Surveys
- Pre/Post Unit Achievement Assessments

What's Needed from Curriculum Teams

- Pilot-Test Lesson Evaluation Forms
- Topic/Lesson Activity Outlines
- Multiple Choice and Short Answer Questions (2 to 3 items per lesson)

Timeline For Needed Items

- As lessons are completed
- By May 2005
- For September 2005 Field Test start
- See timeline handout





Overview

- Pilot Test Data
- Beta Test Data
- Field Test Design Considerations
- Assistance from Curriculum Subcommittees
- What I Need
- Summary: Scheduling and Timeline Binder
- Ethnographic Update
- Presentation update from Lemyra

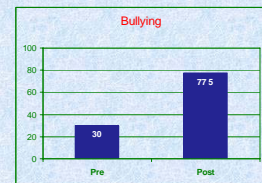
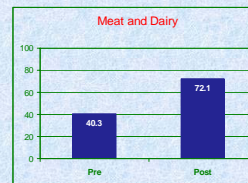


Pilot Data

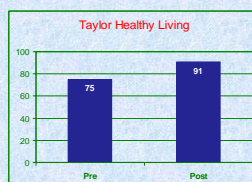
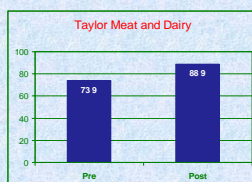
- May: 4 reporting sites (9 total reports)
- Strong pre-post findings (at lesson level)
- Reports on lessons have been excellent
- Review data



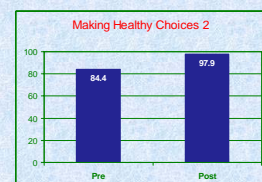
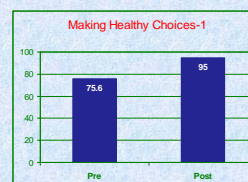
Pilot Testing Ten DETS Lessons

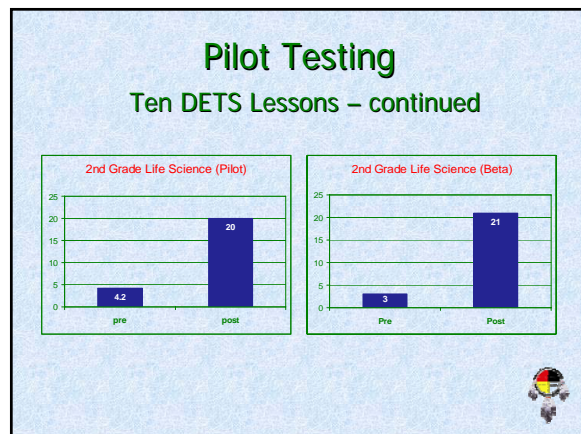
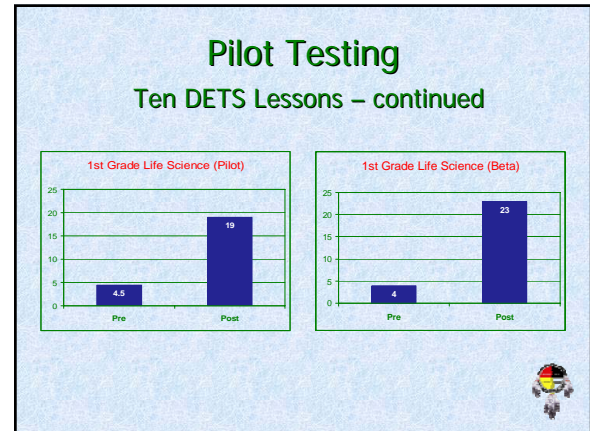
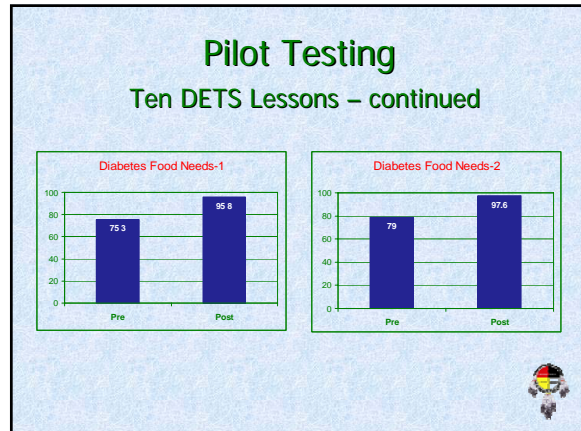


Pilot Testing Ten DETS Lessons – continued



Pilot Testing Ten DETS Lessons – continued





- ### Beta Data
- Very preliminary
 - Lesson Level
 - Lessons that are tested for a second time
-

- ### Thus Far
- 9 pilot reports issued (some Beta data)
 - All pre-posts statistically significant
 - Writers & Teachers using pilot web survey (i.e. 26 responses)
 - Gaps:
 - Test items
 - Content outlines
-

9 Pilot Data Reports Thus Far

	Jan-19-05	May-19-05
Stone Child	✓	
Fort Peck	✓	✓
KBOCC	✓	
SIPI	✓	✓
Haskell	✓	✓
Candeska		
NWIC		
Leech Lake		✓

Test Items Thus Far

	Topics	Author
K - 4	Everybody's Lunch (7 MC; 3 SA)	Mary Hindelang
	Traditional Diet & Exercise (8MC; 4 SA)	
	Life Science (10 MC; 36 SA)	Kenan Metzger
	Making Healthy Choices (10 MC; 6 SA)	
	Meat & Dairy (8 MC; 8 SA)	
5 - 8	Food Needs of Humans (8 MC; 8 SA)	
	Art and Diabetes (12 MC)	Malinda Pekarcik
	Fit and Sit Check (6 MC)	
	Diabetes Pre/Post Test (9 MC; 1 SA)	Janet Belcourt's Team
9 - 12	Body Systems (15 MC; 4 SA)	



Wanted: Test Items

- 3 per lesson (2 MC & 1 SA)
- Balanced across health & science content
- Touchstone: Health is Life in Balance



Field Test Design Considerations

- Data – 4 data elements
 - Achievement
 - Attitude
 - Teacher web survey
 - Classroom observations
- Timing
- Basic design
 - Pre/post by levels of implementation with limited control classrooms



Assistance from Curriculum Subcommittees

- Receiving multiple choice and short answer questions for each curriculum unit
- Receiving unit outlines and lesson activities to create specificity for attitude questions
- Working with Lynn (K-4), Janet (5-8) and Bill (9-12) to coordinate evaluation needs



What I Need – Soon

("...a little help from my friends...")

Items & Content Outlines

- Help from Lynn, Janet, and Bill: achievement test items and unit/lesson outlines
- Help from PIs and their staff
 - Coordinating matrix: School-x-Teacher-x-Grade-x-Class matrix
 - Distribution of pre/post tests with implementation of DETS lessons
 - Teacher commitment to provide data
 - Site visits during DETS lessons



What I Need -- Eventually

("...a little help from my friends..." -- continued)

The 4 Data Elements

- Pre-post achievement tests (at unit level)
- Pre-post attitude tests (at unit level)
- Completed teacher web surveys on implementation for each DETS classroom
- Site visit data



Summary
"Scheduling and Timeline Binder"

- Sampling classes, printing tests
- Coordinating pre- and post- tests (attitude and achievement) with units
- End-of-semester Online web implementation survey for teachers
- Being flexible yet systematic



Ethnographic Update (Michelle)



Presentation Update (Lemyra)





Appendix D

For Phase II DETS Evaluation Report
June 2005

**Evaluation PowerPoint for
December'04 EAC Review Meeting**

DETS Program Evaluation by Doug Coulson

- Training: Psychology & Statistics
- Vocation: Evaluation
- Avocation: Photography



This Morning

- Evaluation overview
- Role of external evaluators
- Design
 - Use of SEs
 - Pilot - Beta - Field Testing
 - Level of implementation and pre-post
 - Cultural component - ethnographic interviews
 - Timeline
- Instrumentation
 - Overview
 - 9 Forms in Instrumentation Binder
- Data
 - Surveys (paper and web-based)
 - Ethnographic Interviews
 - Classroom observing
- Questions/discussion



Evaluation Overview

- Evaluation subcommittee (11 members)
- Program evaluation - LEAD: Doug - a mix of quantitative and qualitative: focus on the curriculum per se
- Ethnographic interviews - LEADS: Lemyra, Michelle - qualitative: focus on the cultural context of the curriculum



Role of External Evaluators

- Guide design considerations
- Assist with instrumentation development
- Participate in site visits
- Conduct interviews
- Complete analyses
- Report findings
- Recommend improvements



Design: 5Es

- **Engage**
 - Teacher generates curiosity
 - Student shows interest in topic
- **Explore**
 - Teacher acts as a consultant for students
 - Student thinks freely, but within bounds of activity
- **Explain**
 - Teacher asks for justification (i.e., evidence)
 - Student uses recorded observations in explanations
- **Elaborate**
 - Teacher encourages students to extend concepts to new situations
 - Student draws reasonable conclusions from evidence
- **Evaluate**
 - Teacher asks open-ended questions - *Why do you think that ...?*
 - Student answers open-ended questions by using observations, evidence and previously accepted explanations



Design: Pilot - Beta - Field Testing

- Basic Research
- Applied Research
- R&D Research: Pilot, Beta and Field Testing



R & D Research

R & D research is a process used to develop and validate educational products including textbooks, educational video and software, curriculum and pedagogy.



R & D Research Features

- Front-end analysis (e.g., needs assessment; feasibility studies)
- Planning
- Pilot Test (Alpha): informal; ad hoc; small scale
- Beta Test: coordinated; limited scale
- Field Test: systematic; quasi- experimental; large scale
- Dissemination and implementation



Design: Level of Implementation

- Level of curriculum implementation
- Measured via observation protocol
- During Field Test site visits
- Examine achievement differences by level of implementation



Design: Pre - Post

- Unit level achievement tests
- Knowledge survey (pre-test) – sample items from across lessons
- Post test – sample items from across lessons
- Track gain as a function of level of implementation



Design: Ethnographic Interviews

- Document cultural component
- Enhance DETS curriculum with data from
- Interviews with:
 - Community leaders
 - Teachers
 - Parents
 - Members of DETS Program



Design: Timeline

- Pilot Testing Feb '04 through Dec '04
- Beta Testing Jan '05 through June '05
- Field Testing Sept '05 through June '06



Instrumentation: Overview

- Instrumentation Binder: 9 research forms
- 6 of 9 ready to use
 1. Commitment letter
 2. Photo release
 3. Pilot Test Lesson Evaluation (since January 2004)
 4. Teacher web survey on pilot lessons
 5. Observational protocol
 6. Ethnographic interview schedule
- Remaining 3 need input from curriculum groups
 7. Student survey (attitude)
 8. Unit/lesson topic outlines
 9. Unit assessments
- NEXT: More on the 9 forms



One: Commitment Letter

- How teachers can help DETS evaluation efforts
 - Provide data on how to improve curriculum
 - Assists curriculum writers
 - Foundational data for marketing curriculum credibility and effectiveness
- Works to achieve student buy-in
- Links participation with evaluation responsibilities



Two: Photo and Video Release Form

- Teachers take pictures
- Evaluator takes pictures and shoots video
- Visuals can be used to document curriculum project
- Visuals can assist with marketing curriculum project



Three: Pilot Test Lesson Evaluation Form

- Blue form: different color because it has been in use
- Generates feedback for writing teams
- Shows improvement during curriculum development process
- Provides data on curriculum development process



Four: Teacher Web Survey

- Summative
- Cuts across lessons
- Focuses on general lesson components
- Efficient



Five: Observational Protocol

- Three sources: Horizon Protocol; RTOP; BSCS
- Horizon: classroom climate; implementation; overall - 12 rating questions with places for comments (NC)
- RTOP: (Reformed Teaching Observation Protocol) - out of Arizona State University; lesson design and implementation; content; classroom culture - 25 rating questions with places for comments
- BSCS: Actively reviewed and used observational protocols
- Current DETS protocol combines general items from RTOP with simple rating scales used by Horizon and BSCS



Six: Ethnographic Interviews

- Community leaders, parents, teachers, curriculum subcommittee members, advisory board members
- Interviewing by Michelle Chino and associates
- Focus on cultural aspect of curriculum



Seven: Student Survey

- Based on curriculum team's 5-8 Unit/Lesson Outline
- Survey focuses on student *attitude* toward 8 lessons within unit
- Survey reviewed by Evaluation Subcommittee
- Last page contains items from NIH's TOSRA (Test of Science-Related Attitudes)



Eight: Unit/Lesson Topic Outlines

- Provide content for student attitude surveys
- Provide sense of scope-and-sequence for achievement item development
- Provide basis for achievement item sampling plans



Nine: 5-8 Life Science Assessment

- Items from curriculum writing team
- National items to be sprinkled in
- Balance coverage against content and time available for assessment
- Curriculum divisions: K-4; 5-8; 9-12
- Content divisions: Life Science; Health Science
- 3x2 = 6 Knowledge Surveys (i.e., pre-tests)



Finally Ten: Site Visits

- Purpose: to informally meet teachers and some of their students
- Opportunity to do some visual documentation
- Visit: low key and flexible relative to what is happening that day in the school
- Fall 2004: Rocky Boy and Box Elder
- Winter 2005: Dulce and Santo Domingo
- Site visit on a National Science Foundation project, September 2004 in Alaska:





Appendix E

For Phase II DETS Evaluation Report
June 2005

Understanding by Design and the 5Es Worksheet and Powerpoint

Stage 1 – Desired Results

Established Goal(s):

G

Understanding(s):

Students will understand that...

U

Essential Question(s):

Q

Students will know...

K

Students will be able to...

S

Stage 2 – Assessment Evidence

Performance Task(s):

Complex performance

T

Other Evidence:

Homework

OE

Stage 3 – Learning Plan

Learning Activities:

L

5E and UbD

Engage

- 5E
 - Pique curiosity
 - Informal pre-assessment
 - Develop questions
- UbD
 - "hook" in Stage 3
 - Pre-assessment in Stage 2
 - Also in Stage 3:
 - "hold"
 - "where"

Explore

- 5E
 - Constructivist discovery of important ideas
 - Emphasis on experiences
- UbD
 - Constructivist discovery of important ideas
 - Emphasis on making sense of experience by design
 - Also in Stage 3:
 - "equip"
 - "rethink"

Explain

- 5E
 - make sense of learning experiences
 - Reconcile competing ideas
 - Revise conclusions
- UbD
 - Make sense of learning experiences
 - "Rethink" and "revise"
 - "Explain" one of six facets through which understanding is revealed

Elaborate

- 5E
 - Connect ideas, solve new problems
 - Use terminology
 - Draw conclusions
 - Communicate understanding
- UbD
 - Connect ideas through overarching essential questions
 - Use terminology
 - Draw conclusions during learning activities (Stage 3), communicate them in assessment (Stage 2)

Evaluate

- 5E
 - Demonstrate and share understanding
 - Assess their own progress
- UbD
 - Demonstrate understanding through complex transfer task
 - Many routes to assessment
 - Assess their own progress