

Science Education for Public Understanding Program
Assessment Development Centers

Site Visit Portfolio

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**Science Education for Public Understanding Program
Assessment Development Centers
Site Visit Report**

**Lily Roberts
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Summary of SEPUP ADC Site Visits

In order to provide a clear assessment of the implementation of the SEPUP Assessment System I decided to use a portfolio approach. On the one hand, it is an assessment of my performance that can be used to evaluate my work as a doctoral candidate field researcher (i.e., evidence for my dissertation proposal review). On the other hand, the portfolio provides an assessment of the three SEPUP Assessment Development Centers (ADCs) that I visited and issues related to the implementation of the assessment system. For example, I had developed a comprehensive check list before my site visits and sent it to the ADC directors by electronic mail and post, contacted each director by electronic mail, and discussed the site visit with each director by telephone. In my estimation, the ADC directors had clear instructions, ample opportunity to ask clarifying questions, and sufficient time to contact all ADC teachers in preparation for my site visits. As you will discover in this report, there was some variation in the preparedness of the three sites.

The site visits all occurred in the month of May, which for most schools is a time for the school year to be wrapping up and the curriculum is winding down. In terms of opportunities to see SEPUP in action, my visit to Colorado was truly affected by timing. One Colorado school year was ending the week of my visit (Mandalay Middle School in Jefferson County School District). The reality of field work is that it is extremely difficult to be able to see students near the end of the year and go to multiple sites.

Another dilemma was access to principals for post interviews. In Alaska, I interviewed three, but I missed one that I had pre-interviewed because he was unavailable and added one that had not been pre-interviewed¹. In Kentucky, I interviewed both principals that had been pre-interviewed. Originally, I had interviewed all five principals in Colorado. This time I did a partial interview with one principal because he was rushing off to another meeting and I met briefly with another principal who was preparing for graduation and other end of year activities (an interview had not been organized in advance by the teacher or ADC director). At Mandalay Middle School the principal had been transferred to the District office and the interim principal was retiring at the end of this year, so the interview was not scheduled. Fortunately, much of the contextual information was collected on the

¹ The Alaska ADC director asked that I interview this principal for “political reasons” (i.e., as a show of support for the teacher). The principal was unavailable for a pre-interview because he has been battling cancer; he will retire this year.

pre-interview and the purpose for the post was to identify any major changes pre to post.

Most of the teacher interviews were conducted during the site visits. Three teachers remain to be interviewed by telephone. One was ill the day I was scheduled to visit his school in Anchorage, so I conducted the ADC Director interview that afternoon instead. One in Colorado was not conducted because the site visit had not been coordinated in advance, and another in Colorado did not work out because of the scheduling of the moderation session directly after the classroom observations.

I talked with students in many of the classes and got varying responses to the SEPUP course. Most comments were positive; a few sounded as if they were prepped. One class in Alaska was rather negative, which was due in part to the fact that the teacher had integrated other units throughout the year into her curriculum, and SEPUP was taught as a series of units rather than a cohesive course.

I interviewed the ADC directors for each site. In the case of Kentucky, I jointly interviewed the director (Ken Rosenbaum) and the moderation facilitator (Bernis Crawford). These interviews were very informative in terms of program issues, such as the delivery of materials. Further, the ADC directors were able to provide a different perspective on teacher change through the implementation of the SEPUP assessment system.

I was able to take photographs in several classrooms to capture students using SEPUP activities. The photographs follow the narrative for each ADC section in this portfolio, and I have provided captions for each photograph. Some students really wanted to be photographed while others were too engrossed in what they were doing to care. In classrooms where more action was taking place, I took more pictures. However, I did take a picture of one class in Colorado that was taking Post Test B (i.e., the Student Survey followed by the NAEP and Golden State Exam science items). One common comment from target class students was that there was too much assessment and writing.

The photographs also provide documentation of context. For example, you can compare the facility differences between M. Scott Carpenter Middle School and Mandalay Middle School on one page in the Colorado section. Mandalay is a new school built in a “yuppie” subdivision of northern Denver. In fact, in the past year the school has been completely surrounded by upscale housing developments. I first visited Mandalay in May 1994 when we were selecting ADC sites for the field test, then again last September and then in May 1995. M. Scott Carpenter Middle School, where John Sepich teaches, serves a predominantly low income, ethnically diverse student population. In fact, John commented that two of the students in the class that I saw were wearing electronic bracelets and a number of his students end up attending the alternative secondary school (Vantage Point Campus, 7-12). The photographs also provide an indication of student diversity and classroom organization.

Emerging Issues for the SEPUP Assessment System

Several issues emerged during the post site visit that provide insight into the implementation of the SEPUP Assessment System including moderation. These issues revolve around administration and coordination, the appropriate or optimal unit of change, and staff development and support.

Administration and Coordination.

The role of the ADC director is critical. There needs to be an individual that organizes the group for moderation, provides staff development opportunities, and functions as an advocate for the teachers using the SEPUP Assessment System. The director does not necessarily need to facilitate the moderation sessions, but they need to convene the sessions. Teachers have been successful moderation facilitators. In Alaska for example, Lori Gillam and Mary Klopfer shared responsibility for facilitating the moderation sessions in the absence of the Director (Donna was not available for at least two of the sessions). It is worth noting that Mary was prepared last summer during the ADC Assessment conference, and that Lori was a continuing SEPUP teacher who participated in the writing conference last summer in Berkeley. In Kentucky, the ADC director convenes the meeting and discusses local issues, then turns it over to the moderation facilitator. Bernis Crawford was a SEPUP pilot test teacher last year, but was released from classroom duties this year to work at the District office on science with moderation facilitator being one of her many duties.

In terms of school-based administration, teachers need support from their principals and in the case of SEPUP this was generally not an issue. Quite frankly, most of the teachers probably would have received support to do almost anything they wanted because they are respected by their principals and have a long history of involvement in innovations.

Optimal Unit of Change.

This category is directly tied to the administration and coordination issue, but deserves and requires separate note. In two of the three sites that I visited, the ADC director is a District person. In the third case, Colorado, the ADC director is a classroom teacher. Colorado is also unique in that all five teachers in the ADC are in different schools AND districts, which severely minimizes district buy-in for the project. Further, and John Sepich, the ADC director, admits this fully, his power to facilitate the group is minimal because of the lack of a common denominator, such as a district. Consequently, it appears that the model for change inherent in the SEPUP Assessment System is extremely ineffective in a diffuse situation. In general, it appears that the optimal unit of change to be targeted is that of the school district, or possibly a school with more than one SEPUP teacher.

In Kentucky, the ADC director has been working to convince his District that all 24 middle schools in the Jefferson County Public School system should be using SEPUP. Ken Rosenbaum, the ADC director, hopes to use the current SEPUP

teachers as consultants and eventually train a pool of SEPUP substitutes that will be available when SEPUP teachers need to be out of their classrooms for moderation.

In Alaska, four of the six ADC teachers were in the Anchorage School District and the ADC director, Donna York, is from this District. The two other Alaska teachers are from the Matanuska-Susitna (Mat-Su) District, but their District had made assessment the central theme for all staff development for the 1994-95 school year. Further these two teachers had prior experience with SEPUP; one had been a SEPUP pilot test teacher and the other had substituted for the first using SEPUP. The Alaska teachers received release time and spent whole days working on moderation and assessment. The whole day together was critical for this group to develop a bond that enabled them over time to come to respect each other and “jell” as a group. When I visited this group last October, I had concerns that personality conflicts would destroy the group or that some might quit. Needless to say, this did not happen. Several of the teachers commented that the full days together made the difference in their ability to work out their differences and eventually grow to respect each other.

Another way to examine the issue of optimal unit of change is to consider what level of support a teacher needs to be able to use the SEPUP Assessment System. Can teachers easily use the embedded assessments and scoring guides on their own? Teachers described how they internalized the scoring guides and yet when they came together as a group for moderation, they saw how other teachers used the same scoring guides and this opportunity to reflect provided new insights into their own teaching as well as their students’ understanding of the materials. The professional development for teachers comes from the interaction with colleagues and not in isolation using the assessment materials. One of the troubling issues that teachers are still confronting is the conversion of scores to grades. Interestingly, at this point, the conversion from scores to grades has remained an individual act. Teachers have not come up with an agreed upon metric and the accountability systems within which they work still demand grades. Parents still demand grades because for college bound students it is the *raison d’être*. Teachers have used the scoring guides with students and some have shared them with parents.

Staff Development and Support.

According to the field test teachers and the ADC directors, teachers need ongoing staff development and support to use the SEPUP Assessment System. Although the terms embedded assessment and rubrics or scoring guides have been in existence for quite some time, teachers still need support in changing their beliefs and instructional behavior when it comes to assessment. There is a need for initial preparation to use the assessment system, including the embedded activities, the scoring guides and the moderation process. In the three sites visited, the quality of moderation varies, but so does the amount of experience with using the process and the amount of time devoted to staff development. As noted above, the full days that Alaska used were critical not only to forming a cohesive group, but to learning about the moderation process and learning from each other how the assessments

were working in their classrooms. In this way, the moderation meetings became the ongoing support that teachers needed as they implemented the SEPUP course. In Colorado, the situation was quite different, because the teachers always met after school. The Colorado group never really grew comfortable with the moderation process and much of this is probably attributable to the lack of a solid block of time together. More issues are noted below regarding Colorado.

Teachers do not need to be at the same school for the SEPUP Assessment System including moderation to work, although with fiscal constraints this might be the ideal. In Alaska and Kentucky, both with District level change initiatives, the SEPUP teachers were all from different school sites. Most of the SEPUP teachers had some connection with an on-site teacher, either another science teacher or an interdisciplinary team member. The support from local colleagues was generally quite good.

Both teachers and the ADC directors were adamant that the main thing that a teacher new to SEPUP would need would be staff development. First in terms of the philosophy of SEPUP and then in terms of the mechanics of the course and the assessment system. Expectations for teachers need to be clearly spelled out. The teachers were adamant that the Assessment Manual needs to be integrated in the Teacher's Guide for the course.

Another outcome of staff development that cannot be overlooked is the creation of a group dynamic. Teachers using the SEPUP Assessment System need to see the value and understand the purpose for the embedded activities, the scoring guides and the moderation process. Otherwise it will be "a waste of time" as one of the Colorado teachers noted. However, this same teacher, according to the ADC director, was always the least prepared when she came to the moderation sessions. The Colorado group seemed to be the least cohesive. Issues that were problematic in the beginning continued to plague this group until year's end, including protection of one's own students and inability to see the value of moderating other teachers' student papers. This group never quite jelled in the way that Alaska or Kentucky did. Given the Alaska example, the fault cannot be relegated to personality differences alone. Clearly, structural issues limited the cohesion of the Colorado group, such as being from different districts, meeting after school when teachers were already tired, having only one teacher rather than a team attend the ADC Assessment conference in Berkeley, and never taking whole days for moderations allowing time for insightful discussions. The moderation sessions on tape as well as the one that I visited were very perfunctory, limited discussion occurred, and the focus seemed to be on getting the scores down on the forms rather than taking the opportunity to engage in professional development.

Alaska ADC (May 8-12, 1995)

During the Alaska site visit, I visited five of the six SEPUP teachers; one teacher had to cancel the scheduled visit due to illness. I interviewed three principals and the ADC Director, Donna York, from the Anchorage School District. I spoke with students in all of the classes either as a whole group and/or as I observed them working on activities. The moderation session was held on the first day of my visit, so I was able to confirm the itinerary for my school site visits with all the participants. I also conducted the focus group at the conclusion of the moderation process.

Alaska has been involved in science education reform for some time now. Currently, five school districts from Fairbanks to Kenai are involved in a new NSF-funded project for restructuring secondary science (grades 7-12) called POLARIS (Project On Leading Alaska Reform In Science). POLARIS is housed in the Anchorage School District. Before POLARIS, CAPS (Concepts for All Projects in Science) was established under a U.S. Department of Education project in which Alaska was one of six Scope, Sequence and Coordination sites engaged in K-6 science education reform. Assessment has been a large part of both of these grants, including student journals and performance tasks. Alaska anticipates providing a lot of teacher inservice in the next four years in grades K-12. The minimum will be 100 hours per teacher of science inservice.

Alaska ADC Focus Group Summary: May 8, 1995

Below the focus group questions are identified in bold followed by the response summaries.

1. Briefly describe how moderation takes place at your site.

Typically, the Alaska ADC teachers met for a whole day to moderate student papers. They met at one of the teacher's homes or the ADC director's home each time. Since three of the six teachers live and teach more than an hour from Anchorage, using a full day to moderate was basically a given.

Although four of the teachers are in the same district (Mary's school is still an hour from Anchorage in good weather, but unreachable during avalanche season), it was not possible to get the student papers ahead of time to read and score. The teachers actually modified the process so that they felt like they were scoring from a common understanding. To accomplish this, they would meet and read a few papers and then discuss how they were scoring, which included interpretation of the prompt as well as the levels of the scoring guide(s). After reaching a consensus at this level, they proceeded to score the rest of the student papers. They worked in pairs at first to go over student papers and discuss scores and scoring, then they met as a group for the six teachers to discuss discrepant scores and reach consensus on scores. At the end, exemplars were drawn for each score level for which they had examples.

2. Is the moderation process useful in terms of:

a. learning to use the scoring guides? Alaska's answer was: "yes, without it the Scoring Guides would be impossible." The teachers did not feel that they could "hammer it out" on their own. [*scoring on own--not as critical in the interpretation of the rubric-->need to clarify from audio tape*]

One of the teacher's said that she needed to clarify the score levels all the time as she used the Scoring Guide on her own, but after moderation it was easier to score using the Scoring Guide. This teacher does not have a science background at all, however, she is now interested in obtaining an "endorsement in science" from the university.

b. gaining a better understanding of student performance? The Alaska teachers felt strongly that the moderation process helped in this regard; they responded: "absolutely." Teachers' comments included:

- "helps clarify my expectations;"
- "helps me to see objectively;"
- "helps me to see how I can bring my students up to a certain level;" and
- "helps me to assign a grade on process because I can defend grades on processes with the scoring guide."

c. informing your instruction? The teachers indicated that during the moderation meetings they learned ideas and better ways to do the activities and scoring. They indicated that next time they do the same or a similar activity, they will do things differently. Another comment was that the process helped to clarify expectations, so the teacher moved from global to specific needs of students. This teacher noted that otherwise she felt that she asked too much of her students.

d. enhancing your own professional development? Alaska teachers felt that they learned a lot. For example, teachers noted that they learned to break things up into elements, how to put assessment into a more objective context, and used more variation in assessments.

e. other? The Alaska teachers were troubled by the over lap of several of the variables and the elements on the Scoring Guides. They suggested that "one large rubric" would be a useful way to show the variables for the course.

One teacher commented that the moderation process "changed dramatically how I do business at my school." The support of the group was important as well as knowing that they could call Berkeley if they needed assistance.

Other issues that were discussed include: how to transfer scores to grades... [*NEED TO LISTEN TO TAPE TO CLARIFY-->how do I assess student learning; who should decide what's important? how to transfer scores to grades.*]

3. What are the major advantages and disadvantages of moderation?

a. Have you modified the process at your site? If yes, why and how? As explained above in the description of the moderation process, Alaska has adapted the process somewhat. Sometimes they work on a few student papers, ask clarifying questions and engage in a discussion, then go on to scoring the rest of the papers.

b. How could the process be improved? What changes have you instituted that you consider successful? The Alaska teachers feel that there needs to be time to clarify and discuss the scoring guide. For example, they might want to consider “how does it apply to this activity?” or “is the prompt specific enough?” to elicit the type of response that would fit with the score levels. A related comment was that the Link Test item prompts were not specific enough to be covered by the Scoring Guide (i.e., the student’s response would not be reflective of what was expected by the Scoring Guide). Some teachers liked the non-generic scoring guides from last year, but they feel that the generic scoring guides will be useful once the exemplars are available.

The teachers indicated that they would eliminate the pre-write from the moderation and that they would score as a whole group rather than as pairs first. They would also do fewer papers so that they could go more in depth in their discussions.

4. In regards to the overall assessment system, what are the salient issues for your ADC?

Is the assessment system a good idea? Are we on the right track?

The Alaska teachers feel that the project is on the right track with embedded assessment. They also indicated that teachers should not be expected to score all of the Quickchecks. One teacher indicated that she made tests from the SEPUP modules to assess content. Several teachers felt that more content needs to be assessed in the activities.

The teachers noted that the strength of SEPUP is not that it turns out scientists, but that students become more scientifically literate.

--not a balance on the tests; operational definitions --> CLARIFY FROM TAPE

What works best? The teachers feel that the activities and questions work best because they see that the “students have gone to higher levels of thinking” and that the “assessments are an important part of this.” The teachers responded that the students can “write lab reports well now” and that they are “learning from doing not from the scores.” One teacher said that she is teaching students how to use the Scoring Guides and that her students are scoring each other and scoring themselves.

What are the barriers?

Grading is a barrier for some teachers because they feel that they have to grade twice. One teacher indicated that a “3” doesn’t mean an “A” requiring that she go through student papers twice; first to score then to grade. Some teachers feel that

scoring is very time consuming, especially when they have “five classes with about 150 students to score and grade.”

Another barrier is “writing too many responses in this manner.” Teachers feel that it is burdensome for some students (e.g., special education or limited English proficient) and that it is too narrow, that is, it does not address other learning styles frequently enough.

--broken down into points -->CLARIFY FROM TAPE

What would be the biggest obstacle(s) for new teachers using the assessment system (i.e., new to SEPUP not necessarily a beginning teacher)?

The assessment system presents a daunting task for teachers who have not been involved in SEPUP previously. One teacher termed it “scary.” Teachers identified several obstacles, including:

- memorizing the rubrics (one teacher who does not have a science background mentioned this);
- moving from assessment to grading;
- being able to see the growth of students, which will be facilitated by the maps;
- writing emphasis.

One obstacle that teachers faced this year because they were field test participants was that they were not always sure where the course was headed. The blueprints were very helpful and they realize that having the year-long blueprint will be extremely beneficial to overcoming this obstacle.

In terms of the grading issue, one teacher said that it will be much easier once her school converts to narrative grades. The score level descriptions on the Scoring Guides will fit perfectly with this mode of grading.

In terms of the writing emphasis, teachers had several ideas that might help make the assessments more palatable to teachers. Participation in a writing project was one suggestion, so that teachers would learn strategies to help students learn how to become concise writers. Another suggestion was to integrate SEPUP with a technical writing class in a blocked section.

5. Is moderation a feasible method for your site to continue to use after funding ceases? What can you adapt and use in the future?

The teachers do not feel that they can use the process “very much at all” in the way that it has been implemented this year. The major reason being the lack of funding for release time to bring them together.

Teachers did provide several ideas for possible adaptations. One possibility is to work with other teachers at the same school with a common prep time. Another option for teachers that have limited opportunities to work with colleagues is to adapt the process to their own classroom and moderate with students in class. Lori Gillam, who also teaches Chemistry, has had her high school chemistry students

moderate papers and then justify the letter grade. She felt that students got a lot of information from this process about their own ability and level of performance. Another alternative approach for moderation is to work with individual students and coach them.

Alaska Site Visit Notes

The following is a summary of the school site visits. Both the teacher and the school are identified. Context factors are described that provide a framework for understanding the implementation of the field test at each site.

Gina Ireland-Kelly: McLaughlin Youth Center, Anchorage, AK

I visited Gina's school on Tuesday morning. Since my pre-site visit, the move to the new facility was completed and a brief tour was provided. The new facility is very nice and Gina now has lab space whereas before she was using an old sink in a back room. Given the rapid turnover of most students in Gina's school, only three students have been in her SEPUP class all year. These students have been sent to the youth center by the courts, so Gina has students with an extremely broad range of skills and abilities both academically and socially. Students were asked as a whole class what they liked and did not like about the SEPUP course, and how it compared to previous science classes. Their responses are in Figure 1.

Figure 1. Comments from Gina's Students

Compared to other science classes, these students liked SEPUP more because of the experiments. They think it is fun, but they also like that it deals with current issues. In Alaska, fewer people recycle because it costs more. These students considered local issues, such as dumps (old versus new waste processing).

One student, Ruben, commented that "I knew more than I thought I did" about wetlands. Gina said that Ruben had gotten an A at the quarter when normally he had received D's and F's. He had tested at a below normal IQ, but he was in the process of being re-tested.

The class did not have time to do an activity, so Gina had them discuss the video that they had watched in her absence on Monday. I found it fascinating to listen to this particular group of students discuss how the video used Shakespeare's *Hamlet* as a metaphor for Heisenberg's Uncertainty Principle. A couple of students who were concurrently enrolled in a Shakespeare course were quite eloquent in their comparisons.

The class was assigned Activity 48, *Appliance Survey*, for homework, and told that they could either call home or talk to another adult at the school to complete the assignment. Gina's students live in Cottages at the youth center; they are incarcerated. As the principal explained to me, McLaughlin is like five schools within a school based on varying degrees of security requirements. Gina's class is a

more minimal level of security, but the Center also contains a complete lock-down facility where youth are held in individual cells.

Gina's principal, Bernard Wesley, has been very supportive of Gina's, and previously Patty Dieterich's, involvement in SEPUP. Gina was Patty's long term substitute during the SEPUP pilot test, but Patty has taken an extended maternity leave so Gina replaced her full-time during the field test this year. He noted that Gina has been very enthusiastic year and that he ensured that she had free access to her classroom/lab during non-school hours to prepare. Bernard noted that SEPUP's approach, using cooperative learning and hands-on activities, is effective with all Center students. He indicated that one of the Center's science teachers will be involved in POLARIS this year.

I completed the teacher interview after the class concluded. In the afternoon, I interviewed the ADC director, Donna York, at her Anchorage School District Office. Jim Petrash's school visit was canceled due to illness. There was no other opportunity to return to his school during my site visit.

Lori Gillam: Steller Alternative Secondary, Anchorage, AK

On Wednesday, I spent the day with Lori Gillam. Lori teaches at Steller Alternative Secondary School (grades 7-12) and uses SEPUP with eighth graders. Unlike McLaughlin, students must apply and go through an interview process to be selected to attend. Steller is a high energy school; the students are exceptional in many ways (academics, music, art, etc.). The week of my visit Steller students and teachers were preparing for a schoolwide Olympiad on Friday. Students are assigned to faculty counselors, and they meet with the counselor first period. In this way, the school provides an atmosphere of support for all students.

I arrived about 9:15 and checked in with the Office to see if the principal, Don Shackelford, was available. He wasn't at first, so I went down the hall to Lori's room. She and I spoke briefly, then we went back to the office to find the principal. Don is very supportive of Lori and her use of SEPUP. He likes the fact that SEPUP is on a "small scale" because it saves resources. He also likes the fact that SEPUP is "built around asking questions." He reminded me that Steller is already a "hands-on kind of school" and more engaged in active learning than other schools. Steller's approach to learning is based on the inquiry method, and the school's atmosphere is conducive to questioning. Next year, Steller is moving away from grades to narrative assessments of students. The narrative will be a synthesis of input from the counselor, teacher and the student. Lori is very excited about the narrative "grades" because they will fit so well with the SEPUP score levels on the scoring guides.

After interviewing the principal, I rejoined Lori in her classroom where one of her SEPUP classes was preparing for the salmon release. Lori works on the Salmonid Project with the Alaska Fish and Game Department. She raises the salmon eggs in tanks her classroom, then the salmon fry are released into a local lake. The number of fry released are counted (my job was to keep track of the count) and reported back to the Fish and Game Department. We piled into cars and drove about five miles to Lake Takula, released the salmon fry off the dock (see pictures),

and then had brown bag lunches. I purposely spent extra time with Lori and Mary Klopfer because they had taken on the role of moderation facilitators this year, so I wanted to have additional time to speak with them informally about their experiences this year.

Lori was also involved in another interesting project this year, called “Seeds in Space.” Working with the University of Alaska in Fairbanks, she was able to send seeds up in a rocket (about 400 miles into the atmosphere), then they were retrieved and returned to her to test what effect the exposure to the atmosphere had on the seeds.

Lori completed Activities 48-50 in Part 3, *Energy*; however, she really wanted to do *Island Factory* with her students this year. In the afternoon, I observed her last period SEPUP class making glue (Activity 62). Lori’s intention at the time of my visit was to go back to *Energy* once she finished *Island Factory* and also to cover a bit more on Waste Hierarchy.

Lori’s classroom is unique in that it is designed for high school chemistry. It is actually two adjoining rooms; one is the classroom, and the other is the laboratory with high tables, sinks and other typical equipment found in a chemistry lab. Although the set-up seems ideal, it has a major drawback; Lori cannot be in two places at once. Once students finished their lab work and returned to the classroom area, she had no control over what they did. They were supposed to be writing up their lab findings, but they were mostly goofing off. Lori told me later that this class really did not like to write in class but that they managed to get their work turned in.

Some students had trouble making glue. In some cases, the milk would not filter through the filter. Apparently, some students made measurement mistakes in mixing the ingredients. An advantage that Lori has is a longer than normal class period. This class lasts 90 minutes, and this allowed sufficient time to introduce the activity, do the lab and write up the results. Students had time to start over when they made mistakes in measuring the ingredients.

Lori was ready to leave school as soon as the day was over. We went to a nearby restaurant to conduct the teacher interview. Her son, Colin, who was in the SEPUP class that I visited, came with us. Lori is very positive about SEPUP and feels that she has gained much in the past two years. In particular, she has been interested in developing her ability in the area of assessment, so the opportunity to work with the scoring guides and moderation this year was very helpful to her.

Mary Klopfer: Girdwood (K-8) School, Girdwood, AK

Donna York, the ADC Director, visited all the school sites with me. We drove south to Girdwood on Thursday morning to observe Mary Klopfer’s seventh grade SEPUP class. Mary’s class was using last year’s version of *Island Factory*. They were working on Industry Comes to Town, which is Activity 60 this year, but was Activity 72 last year. After Mary introduced the activity, the students worked in groups to prepare a presentation of reasons for allowing, or not, several industries to come to town. The opposing groups stood up together; one group presented the advantages, then the other group provided the disadvantages. Each industry

(chemical, computer, food processing, and oil refinery) was addressed by a different groups of advocates and opponents. Mary had asked them to consider the reactants, products and by-products of each industry as they prepared their presentations.

Students were asked to take notes for all presentations. After the presentations were complete, Mary led the class in a discussion of what were the common advantages and disadvantages across all the industries. After identifying numerous common factors, such as jobs, hidden costs, growth, increased traffic, safety, and environmental impact, the class engaged in a very heated discussion about decision making criteria. The local example that Mary provided for further discussion was: if there was a plan to build a golf course in Girdwood, what would they use as decision making criteria. Responses focused on whether or not it was needed and valuable, and if it was possible to minimize the impact of the disadvantages.

I was able to ask several students after class what they liked and did not like about SEPUP this year. Their responses are in Figure 2.

Figure 2. Comments from Mary's Students

Donna and I re-joined Mary at one o'clock during her preparation period. At this time, I conducted the teacher interview. Mary has been a long-time user of SEPUP and its predecessor CEPUP. Her background is in mathematics not science, but she has had to teach both in the small K-8 school in Girdwood. The moderation process and meeting with the other teachers was very helpful to her because she feels so isolated in her school. She indicated that the "embedded assessments opened up a wealth of possibilities in modifying instruction overall." Mary said that the challenge this year was in not knowing exactly where the assessment part was leading. She felt less confident because of this. She also expressed a concern about the validity of the items and questions how much is real growth and how much is simply maturation.

Mary indicated that she always felt good after moderation. She described moderation as "six minds rethinking" how things went and the awareness that was brought about through "exchange of thoughts." The whole process helped because it "broadens thinking about assessing student learning." She gained ideas from the other teachers about how to modify instruction or things to enhance instruction.

Mary had a thought that it might be interesting to bring a non-SEPUP teacher colleague to observe the moderation. She has a co-teacher in Language Arts. This idea no doubt was stimulated by her feeling of isolation as the only 7-8 math-science teacher in a small, rural school an hour south of Anchorage.

I had not pre-interviewed Mary's principal last Fall because he was at the Anchorage District Office dealing with the impending teachers' strike. I did meet him this time, but he is retiring at the end of this school year so no interview was conducted.

Linda Churchill: Wasilla Middle School, Wasilla, AK

On Friday, Donna and I drove north west to “the valley” to visit the two teachers in the Mat-Su District. We first went to Wasilla to visit Linda Churchill’s SEPUP class. Two teachers at Wasilla are involved in the new NSF-funded POLARIS (Project On Leading Alaska Reform In Science) teacher enhancement program.

Linda’s school is undergoing major reconstruction. Her classroom flooded twice this year, soaking the students’ assessment folders, but she did her best to dry them out. The school is building a new science wing that will contain four computers per classroom that will be networked. The school was hit hard this year by an OSHA inspection. Linda and other science teachers have been kept busy inventorying all the chemicals and the school has had to provide inservice on safety regulations.

I observed her eighth grade SEPUP target class working on Activity 49, Ice Melting Race. She had assigned the Appliance Survey as homework and it was due the day of my visit. Linda began the class with Reading Tag in which students were to read a paragraph from the Student Book, then call on (“tag”) someone else to read next. The classroom is set up with tables for groups of four in the back and to one side of the room (L-shape along the perimeter), and desks in rows facing the front of the room. The students began the class at their desks, but then moved into their groups at the back of the room for the activity. The class meets for a typical 50 minute period.

The students were each given a bag with one ice cube. They proceeded to use a variety of methods to melt the ice. One questions the ability to re-use the bags for the next class both for reasons of cleanliness and durability. The students put the bags in their mouths, under their armpits, they cracked it against the table, rubbed it between their hands, blew on the bag, or sat on it. One boy squeezed the bag so hard the ice cube shot out of the bag and across the room. There were also sinks in the back of the room, and at least one student ran warm water over his bag to melt the ice cube.

In discussing the variables that affect the rate of melt, the students discussed the size of the ice cube, the fact that it was exposed to the air before they got it, and different body temperatures. Linda put a bar graph up on the overhead then recorded on it the different amounts of melted water reported by each student. She discussed with the class energy transfer, the source (body) and the receiver (ice cube). When she asked “what about crushing the ice first,” a student responded that there was more surface area when the ice was crushed. Linda then went over the highlights of questions 3 and 4 with the class before assigning those questions as homework.

Linda’s students had the following comments about what they liked and disliked about the SEPUP course this year. Their responses are in Figure 3.

Figure 3. Comments from Linda’s Students

Linda gave me a copy of a note a student had written to her anonymously (copy is in portfolio). The note says:

3/20/95
Mrs. Churchill,
I would like to thank you for being an excellent teacher. I appreciate your efforts. I have learned <u>much</u> from your classes. I have learned not only what is taught in the books, but I have been taught to be self-reliable, self-confident, and happier. I want you to know that I am grateful for your motivation and praise, and believe that you deserve some of what you give.
In your class I feel intelligent, Thank You!
Anonymous

I interviewed both Linda and her principal, Eric Henderson. Mr. Henderson indicated that he has been very happy with SEPUP; he sees it as a practical approach to science. He said that at a recent principals' meeting the discussion focused on making secondary science more integrated rather than teaching discrete courses (e.g., the typical sequence of Biology, Chemistry then Physics). He indicated that the feeder elementary, Iditarod School, is very science-oriented.

Linda feels that she is learning how to assess students' higher order thinking through her involvement with SEPUP. She said that she "can see the quality of work improving." She indicated that the prompts are much better than last year. Her students do not like to write very much and she has been concerned that so much writing might turn them off to science. She said that if she had not felt so rushed this year that she would have added other assessments, such as posters, oral presentations, and more projects. She also indicated that the lessons take longer than the Teacher's Guide indicates.

Linda works with two teams at her school; one is the group of science teachers and the other is her eighth grade core team (math, science, language arts and social studies). Linda has a lot of support from her colleagues at her school. She also feels that the moderation with the other ADC teachers was important to help her understand the scoring guides and how to apply them to specific lessons. She feels that the moderation process helped her use the scoring guides effectively.

Amy Spargo: Colony Middle School, Palmer, AK

After lunch, Donna and I proceeded to Palmer to visit Amy at the new school in the valley. The students at Colony come from much more affluent families than the Wasilla Middle School students. Wasilla is a lower socioeconomic group that has an alleged group of marijuana producers in the area (the equivalent in California is the Garberville area in Humboldt County). The Colony parents tend to

be professionals; you pass by some of their large, beautiful homes on the road to Colony Middle School.²

Amy's SEPUP class met for 70 minutes. They worked on Activity 50, House of Cards, in their "Co-op groups." Each classroom has a nickname, which is displayed on a flag outside the door; Amy's class is designated the Chili Peppers. The classroom is set up like a fish bowl. Two teachers share an elongated office that has a plate glass window that looks into each of their respective classrooms. The door to Amy's office is just to the right as you enter her classroom. Her room is small compared to Linda's, but the students are at tables of four, not at separate desks.

The students work in their Co-op groups to build the House of Cards. One boy was sent out of the room because he got angry and knocked down his group's card house. After completing the task, students were to calculate the energy units. Amy discussed potential and kinetic energy with the class, referring to her drawing of a stick person pushing a boulder up a hill on the chalkboard. Students asked some interesting questions, such as:

- How do we know if the energy got into the cards?
- Can you see [energy] under a microscope?
- Does it get released from your fingers?
- Do all things have the same kinetic energy?

I was able to speak with Amy's whole class about their likes and dislikes about the SEPUP course. Two things need to be noted. First, this was the last class on a Friday afternoon; it was warm and sunny outside; and the students had just returned from a two-day field trip to Homer. Needless to say, they were a bit distracted and quite ready for the weekend to begin. Secondly, Amy apparently has interspersed SEPUP with other science units all year to meet content demands specified by her school based on the CAPS principles (e.g., ecosystems and life cycles). For example, one activity that the whole school participates in is building snow caves in the parking lot and the students love doing this. Amy's students had the following comments about what they liked and disliked about the SEPUP course this year. Their responses are in Figure 4.

Figure 4. Comments from Amy's Students

The last two comments under students' dislikes are actually positive from a development stand point. We would hope that the course got harder over the year. This class may have felt this more keenly because they were involved in so many non-SEPUP activities this year. The fact that they are looking for answers in the back of the book indicates that they are not very willing to work on writing. Drawing from this, we need to be careful in how we provide student exemplars to teachers. Perhaps a caveat is needed.

The principal was not pre or post interviewed. In fact, I never met him at all.

² The mountains that loom large behind Colony Middle School are absolutely breathtaking.

The teacher interview was completed after school. Amy indicated that she had trouble tying all the SEPUP labs together thematically. One wonders if this is because she integrated so many other units and hence SEPUP was treated more as a series of units rather than a whole course. Another possibility is that she has less experience with SEPUP; last year she worked as a substitute teacher for Linda Churchill in Wasilla. The other possibility is that SEPUP does not have a storyline that carries throughout the course, but comes across as several, large modules, thus is difficult for teachers to tie the course to a particular theme. Since I am not a science curriculum expert, I cannot make a judgment on this front.

Amy indicated that this class is an immature class of eighth graders. They were not always enthusiastic and felt that there was too much writing. Another factor was that these are the “non-Algebra” eighth graders, meaning that they are not the top students. This class was taught at the same time as Algebra. Amy indicated that the parents were excited about things that could be related to home, but some resented that the course was not more portable. The students needed help in keeping track of things and Amy provided organizational help.

Amy described the early moderation sessions as “painful” and people left with “hurt feelings.” She went on to say that “we all may have had different expectations in the beginning” but she was “happy with how it jelled.” She also said that it “comes down to hammering out your educational philosophy.” The moderation sessions were important according to Amy because they “normalized the whole experience.” The teachers came together and shared problems and argued about philosophical differences. Amy noted that she has a master’s degree in education/counseling and that her philosophy of education was “put to the test in this group.” Amy suggested that it would probably be beneficial for a group like this to first “retreat” together, so that they have an opportunity to “gain mutual respect” for each other.

Kentucky ADC (May 18-19, 1995)

During the Kentucky site visit, I visited three of the four SEPUP teachers. One teacher had an all-school special event for elementary students, so she was not able to host a site visit for me. I interviewed the two teachers and the two principals who had been pre-interviewed. I interviewed the ADC Director, Ken Rosenbaum, from the Jefferson County Public Schools and Bernis Crawford, a SEPUP pilot teacher who was on loan to the district and acted as the moderation facilitator. I spoke with students in all of the classes as I observed them working on activities, but the time was too short to engage any of the classes in a whole group discussion. I did have the opportunity to interview one student from Ella Barrickman's target SEPUP class. The moderation session was held on the first day of my visit, so I was able to confirm the itinerary for my school site visits with all the participants. I also conducted the focus group at the conclusion of the moderation process.

On Thursday evening, I met with the Concerned Science Group, which includes representatives from various educational agencies in the state, including the Department of Education, the university, and K-12 schools and districts. Unfortunately, this meeting was pre-empted by a tornado warning. I did obtain copies of a draft proposal for the development of the Core of Science Concepts and Skills, which will be followed by the development of Articulated Performance Descriptors with student examples.

Kentucky's reform efforts are unique. The State Supreme court declared the education system unconstitutional in 1990 (??), resulting in the Kentucky Education Reform Act. Kentucky schools, especially those in rural areas, were in need of major changes. (*e-mail Ken and get more information on this and KERA*).

Kentucky schools are responding to the Kentucky Education Reform Act (KERA) of 1992 (ck on date with Ken/lit.). KERA requires that students keep portfolios for writing and mathematics, and work from other content areas must be included. For example, a SEPUP lab report could be inserted in the writing portfolio.

The testing umbrella for KERA is the Kentucky Instruction Reporting Information System (KIRIS), which tests students at grades 4, 8 and 11 statewide. One of the principals described KIRIS as high stakes assessment. In addition to open-response test items completed by individuals, KIRIS requires students to complete performance events, some of which occurs in groups. The SEPUP course seems to be a perfect match for this type of assessment system with the hands-on activities and cooperative groups.

Kentucky ADC Focus Group Summary: May 18, 1995

Below the focus group questions are identified in bold followed by the response summaries.

1. Briefly describe how moderation takes place at your site.

The Kentucky ADC uses the moderation process as described in the manual. They score student papers at the meeting. They did try to score papers ahead of time

once, but it was too stressful. The moderation facilitator draws a grid for scores on the chalk board and teachers fill in scores as they finish scoring (a column for each teacher and each student's scores in a row). Bernis Crawford facilitates the moderation. Ken Rosenbaum, the ADC Director, begins the meeting, then comes and goes during the day.

After all teachers have scored the papers, the moderation begins with a "comment without comments" session. This allows teachers to briefly "vent frustrations" with the scoring guide, the prompt, the activity, etc. After this opportunity to offer comments, the teachers turn to the board to look at student scores. They then select those student papers that are scored differently across teachers and work toward consensus. Consensus is reached, but it is not always easy for some participants. One person may agree reluctantly only because the other three teachers have reached consensus. Typically, the reason for not reaching consensus unilaterally is the unique beliefs or particular situation a teacher is in. The reluctant teacher is not always the same one, so there is not a particular recalcitrant individual in the group.

This group has several teachers who actively use electronic mail to communicate with each other, with other SEPUP classes and with Berkeley. In Ella Barrickman's classroom, her Powerbook was on a table at one end of the room, that had a sign above it which read SEPUP Communication Center.

2. Is the moderation process useful in terms of:

a. learning to use the scoring guides? Kentucky's answer was "yes." Some of the reasons included:

- "we change scores after moderation," indicating that their understanding has shifted based on the process;
- during moderation, the discussion "clarifies" issues related to the scoring guides;
- the process "helps reinforce the idea that scoring guides can be used in many ways;"
- the scoring guide is valuable to each teacher;
- "we clear up discrepancies during moderation" related to the prompt, the score level interpretations and so on.

One teacher noted that as you score student papers on your own you tend to "internalize the scoring guides," however, in the group they see new insights and may change their interpretations. Another teacher commented that the process "makes you step away from it and see differently" and yet another said that it "helps you be more objective."

b. gaining a better understanding of student performance? The Kentucky group valued the moderation process because they felt that they "became better at evaluating [their] students." One teacher pointed out that it helped her to "see that we're expecting too much" of our students. Ken pointed out that it is a "process by which [you] become able to develop standards" and standards are "fine-tuned" over

time. This group feels that the moderation process is essential to preparing teachers because “it is more process than product.” They feel strongly that “massive staff development” is necessary to be able to use moderation and the assessment system. Interestingly enough, Ken wants to provide this staff development, so that all 24 middle schools in the District will be able to use SEPUP. He envisions the current SEPUP teachers as the teacher consultants of the future.

c. informing your instruction? The Kentucky teachers feel that they “learn from each other through the monthly meetings.” They reported that it is “good to get together” because of the collegial support and that the support “keeps you going.” The meetings help these teachers in several ways. They indicated that it is important to see others’ student work in terms of evaluation. The discussion also helps the teachers to “see what you’ve left out of instruction.” It was noted that the “teachers [are] at different places along the continuum [in terms of use of SEPUP and its philosophy], but it is generally a validation of what you’re doing as a teacher.”

d. enhancing your own professional development? The Kentucky teachers said “ditto” (see above) to the comments that they were making earlier. In terms of all the other involvement with educational reform (e.g., KERA; KIRIS), they feel that SEPUP has helped get them involved in related activities. They have provided professional development activities for other teachers (e.g., training them in SEPUP modules). Ella has accumulated 45 hours of professional development. Ken indicated that he would grant professional development credit (if he could) for moderation because of the quality of the professional growth that he has seen.

Ken feels that we need to create a professional development package for the moderation process and the assessment system. He is adamant that there needs to be ongoing professional development to make this really work. Ken indicated that he has watched all of the teachers change this year; he calls them “SEPUP fanatics.” Ella admitted that she has become more excited about teaching. Bernis noted that another teacher had commented that Bernis had become more excited and rejuvenated about teaching. Ellen replied that she knows that she’s really grown because she didn’t have a science background. Ken indicated that the teachers all have different styles and special talents that they use as they implement the SEPUP course.

e. other? Nothing; other comments were integrated above as they came up in the focus group.

3. What are the major advantages and disadvantages of moderation?

a. Have you modified the process at your site? If yes, why and how?

Although the Kentucky group said that they didn't modify the process, they actually did add a component that was very useful for them and that they continued to use all year. The Kentucky teachers followed the scoring of papers with a round-robin, comment without comments session before moving into any discussion. This appears to be a good way to focus the discussion. Moving around the table, each teacher makes a brief comment related to the scoring (e.g., I found that the scoring guide was more wordy than the prompt) and they are not to piggy back on each others' comments. The teachers each make a comment or pass, then the discussion is opened up.

The Kentucky teachers commented that "SEPUP (y'all in California) failed to communicate what you wanted us to do" in terms of the number of assessment activities to be scored and sent in. In the beginning, they thought that they did not need to do all the quick checks. They felt that this was not made clear to them last summer at the ADC Conference.

b. How could the process be improved? What changes have you instituted that you consider successful?

Although it was stressful when they tried to do it, the Kentucky group feels that it would be helpful to deliver papers ahead of time for all to read. They feel that the process requires that the teachers need to go through the course at about the same pace and that "this would be a disadvantage in a large system." However, they also indicated that trying to keep pace "pulls you along" and "you cover more material." One teacher commented that she "learned to tailor the course" so that she could keep up with the group.

Ella wants to re-sequence the course and begin with *Energy* next year. The teachers expressed disappointment that they did not get to do *Island Factory* this year because they ran out of time. They noted that the course is still too long for one year and that *Part 1, Water*, needs to be much shorter because the students get bored.

4. In regards to the overall assessment system, what are the salient issues for your ADC?

Is the assessment system a good idea? Are we on the right track?

In response to whether or not we are on the right track, the Kentucky group said: "Hope so." Ken said, "teaching to the test" is a hot issue in Kentucky and that Kentucky may re-examine the [KIRIS] assessment system. The latest test results are not showing any significant gains, so there is mounting criticism against the reform efforts and the State testing system.

The teachers "would like fewer assessments," but want those that remain to be more in-depth.

Ella had SEPUP Nights at her school for students and their parents. These family science sessions provided parents with information and they got to do activities with their children. This was a very positive approach to making parents aware of the changes in the science curriculum. Denise said that she has “vocal parents” and she has received “good comments” about SEPUP.

Cindy said this is the best way to engage students, but it requires a lot of energy on the teacher’s part. She feels that teachers “need to believe in this to do it.” Cindy also feels that it is important that students become proficient with rubrics, and that “they should be able to self-assess. That way they could see their own level and change what they’ve done.”

What works best?

The Kentucky group at first said it is “hard to isolate” what works best, then they identified moderation and the embedded assessments. They noted that “embedded assessments will continue beyond the project” and teachers can “personalize the scoring guides.”

There was a “big difference in moderations this year compared to last year,” according to Bernis. She said that it helps seeing the same set of papers. Last year they scored in pairs, but this year they score as a group and there are more discussions.

Cindy would like to have more time to do “conferencing” with her students because she feels this is valuable. This year, she could only do this on a very limited basis and typically with students who were having problems. She would explain to students how they could improve their work. She would like to be able to conference with all her students.

Kentucky teachers wondered out loud: “Is the process (i.e., moderation and self-evaluation) teachable to kids?” They indicated that they “would like to “grow” kids in the assessment arena. It seems that they believe that self-assessment is a valuable asset and this provides some indication of their sense of values in terms of reflective practice.³

What are the barriers?

The barriers identified by the Kentucky teachers include:

- it is time-consuming to assess written questions;
- copying [papers];
- there is a need to convince resisters (i.e., reluctant teachers);
- training is important; and
- the “System” still values grades, so there is a lack of balance between the accountability and assessment systems.

³ I’m loosely associating self-assessment with reflective practice.

Another point that was made by this group was that translating assessment scores into grades is still an issue that each teacher must wrestle with. Even with these teachers all in the same school district and very polished in their usage of the SEPUP assessment system, grading has remained an individual act. They have really not come upon a common denominator for the translation of scores to grades.

What would be the biggest obstacle(s) for new teachers using the assessment system (i.e., new to SEPUP not necessarily a beginning teacher)?

The Kentucky teachers identified the following as obstacles for individuals just starting to teach SEPUP:

- converting scores to grades;
- accepting the SEPUP philosophy; it is not all content;
- need energy to teach this way;
- must be able to accept the open classroom; and
- need support from administration and school staff (e.g., the team--the KY middle school teachers all work on interdisciplinary teams).

The Kentucky teachers indicate that they have grown with SEPUP over the past five years. Assessment is part of their culture. New teachers would need to be acculturated to the SEPUP curriculum as well as the assessment system.

Ongoing professional support is also needed. Ken envisions a SEPUP support group of trainers with permanent SEPUP substitutes. The support group would provide intensive training and a support system.

The teachers indicated that the course itself can be very intimidating to do by yourself (depending on Science background). There needs to be a “SEPUP Alliance” created for ongoing support (Kentucky has “Alliance” groups for other subject matter areas).

5. Is moderation a feasible method for your site to continue to use after funding ceases? What can you adapt and use in the future?

Ken is working out a plan to continue, but he needs to figure out how to do it for the whole system (i.e., the 24 middle schools in Jefferson County Public Schools District). The SEPUP support group of trainers is one idea. Ken plans to rely on the current SEPUP teachers as consultants. They want to continue with moderation, but they will need to work out the logistics and financing.

The group indicated that it is difficult to predict given that we “don’t really know what the *real* SEPUP course will look like next year when teachers can do as they please.” For example, if Ella does begin with *Part 3, Energy* next year, how likely will it be that she can participate in moderations with teachers who begin with *Part 1, Water*?

6. Is it necessary to have someone in the Director’s role to make this work?

The Kentucky teachers were in total agreement that the director role is critical. Teachers made comments, such as: “Yes, wouldn’t be where we are without Ken.”

The teachers feel that they “need support” from someone who “focuses on SEPUP people.” They indicated that they “need an advocate for the program.” Ken pushed for release days with the schools, because the schools do not want the teachers to be gone. There is a lot of pressure to keep teachers in the classroom. According to Ken, “principals feel honored to have SEPUP in their schools.” Nonetheless, marketing is necessary.

Kentucky Site Visit Notes

The following is a summary of the school site visits conducted on Friday, May 19, 1995. Both the teacher and the school are identified. Context factors are described that provide a framework for understanding the implementation of the field test at each site.

Given scheduling, I visited three schools in one day. I was able to interview two principals on site, but the teacher interviews were conducted at other times. I observed different SEPUP activities in each of the three classes. Bernis Crawford was my gracious chauffeur (one of her many hats this year working at the District). In the morning, we visited Cindy Detwiler’s and Ella Barrickman’s schools, because they are in close proximity. After lunch, we went into downtown Louisville to visit Denise Finley at The Brown School. The Brown got its name from the old hotel building where it was originally located.

Cindy Detwiler: Kammerer Middle School, Louisville, KY

Cindy’s school is in a middle to upper class neighborhood in Louisville. Minority students, mostly African-American, are bussed in, although it is not called bussing. Her students were working on Activity 55, Electroplating (Student Book, p. 62-64). The students were using a copper solution to make a battery. Most wore safety glasses as they worked on the activity. The students found an error on pages 62-63 in the Student Book: the picture says Copper Chloride, but the narrative says Copper Sulfate in two places. Cindy had mistakenly handed out some bottles of both the waste copper chloride and the copper plating solution. She noted that the waste copper chloride worked better because there is more copper in it than in the copper plating solution.

The students were very engaged in the activity, and they were recording results as they conducted the experiment. Cindy moved from table to table helping the students as needed. There was not time to talk to the whole group, but I spoke with individual students as I observed them do the activity. They like the course, especially using the chemicals as they were during my visit.

I received a copy of Kammerer Middle School’s proposed integrated middle school science curriculum (grades 6-8). CHEM and SEPUP are mentioned by name in this document as “nationally renowned science programs” that are provided by

“an award winning faculty who continually involve themselves in national, state and local leadership roles in science education.”

I interviewed her principal, Butch Martin. Butch was formerly at Johnson Middle School and he said that Pam Boykin “got him enthused about SEPUP.” This was his first year as principal at Kammerer Middle School. He believes that SEPUP helps students in the direction desired by KERA and that students like it because of the “hands-on, discovery learning.” He has attended local SEPUP training which included administrators.

Butch explained the concept of “blending” to me in terms of the team that Cindy works with at Kammerer. There are 120 students assigned to a teacher team of four. Sixty of these students are in the regular program and sixty are advanced. He feels that SEPUP fits well with this heterogeneous grouping model. The students stay together in these blended tracks. Blending is also accomplished as noted above by bringing students to the school from other parts of Louisville.

Ella Barrickman: Westport Middle School, Louisville, KY

Westport Middle School serves a very diverse population of students from poverty level to affluence. The racial composition is representative of Louisville; the principal said that this is “a challenge and a strength.” The school population is stable. The school also serves as the East End Branch of the Louisville Library. There is also a daycare center on site; I could see the young children from Ella’s classroom window.

Ella’s school is actually in a former high school facility making it feel larger and less personable than Cindy’s school, which was designed to house a middle school. Ella’s classroom, however, was very personable and inviting as was Cindy’s. She has numerous fern plants that are growing happily in the sunshine and the classroom decor is warm and friendly. Stuffed animals on the tops of shelves, posters and pictures of students on the walls make it very habitable.

As I observe the students working on making a battery, Activity 54, I am struck by how pleasant they are for eighth graders. They are all engaged in making the batteries as described in the Student Book (p. 53-54). Some students noted some leaking from the multi-tubed plastic container (pictured on p. 53). Students helped each other at their own and other tables. Ella moved among the groups observing what they were doing and helping them work through questions as needed.

Ella teaches SEPUP to all her science classes. She said that the students were very positive about SEPUP, but the other classes were more positive about SEPUP than her target class. Her target class felt there were too many assessments. The class I observed was not Ella’s target class; that class had met earlier in the morning. However, Ella had arranged for me to speak to one of her target class students. I interviewed Mary Poppell, who informed me that she was also passing along comments from others in the target class.

Comparing SEPUP to other science classes, Mary said, in sixth grade she had one lab that was combined math and science. In seventh grade, she had to dissect a frog, but she could not remember why and did not feel that it was useful. Whereas she remembers a lot about the SEPUP labs from the beginning until now (e.g., she

talked about serial dilutions from Part 1). She reported that she has learned things about landfills that she had never learned before. The only thing that she was aware of that KIRIS tests for but is not in SEPUP was astronomy. Other comments from Mary are presented in Figure 5.

Figure 5. Comments from Ella's Student

Ella teams with Neil, the science department chair and eighth grade science teacher. Ella said that Ken had a lottery to select teachers for SEPUP and her name was selected rather than Neil's. She said that Neil uses the SEPUP modules and they collaborate quite a bit. Ella's school received a grant from the Edna McConnell Clark Foundation that allowed her science department to purchase SEPUP materials for the other two eighth grade science teachers. The Student Council sold nature T-shirts this year and gave the money to the science department to help buy SEPUP materials next year. Ella indicated that it would be helpful if SEPUP had large refill sizes of chemicals to replenish kits rather than having to purchase an entire kit.

Ella and Cindy teamed up to present a SEPUP booth this year at the local *Science Showcase*. Their students did some of the SEPUP activities with younger children that were in attendance. From the photographs that they showed me, it was very well done and the students were having a lot of fun doing SEPUP activities. Both principals commented on the success of the booth at the *Science Showcase*.

I interviewed Ella's principal, Jim Stone. Dr. Stone thinks SEPUP is "fantastic" because it fits the needs of the school in terms of heterogeneous grouping. He also indicated that SEPUP is very closely aligned with the draft content guidelines for middle school science. Dr. Stone brought up the SEPUP Parent Nights that Ella provided and how successful it was to have students teaching parents the labs. Dr. Stone reported that he has "three excellent teachers who are committed to [SEPUP's] success." In addition, the sixth and seventh grade teachers also want to be involved.

Denise Finley: Brown School, Louisville, KY

The Brown School is a K-12 alternative school located in downtown Louisville. Students select to attend The Brown; parents must provide transportation, so they also make a commitment to have their children attend. Denise Finley was a comparison teacher during the pilot test of SEPUP and this year was presented the opportunity to teach the course as part of the field test of the assessment system. Bernis told me that Denise has been battling cancer this year, so the progress that she has made with SEPUP is amazing.

Denise's class has a larger percentage of minority students (over half) than the other classes that I visited in Kentucky. The students sit at tables in groups of four; Denise said that she changed groups on a regular basis.

Denise picked students to read from the Student Book. Each student read about a paragraph. She had notecards with students' names, so she checked whether

or not they were on task (i.e., did they start reading from the correct point) as she asked each student to read. After reading the introduction to Activity 50, Denise passed out colored notecards to the groups. The groups worked on the House of Cards, Activity 50. One group had a dissenter who immediately started working on his own, but overall the groups worked well together.

I did not interview Denise or her principal, because they were not pre-interviewed. The pre-site visit and interviews were conducted by Robin Henke, another member of the SEPUP Assessment and Evaluation team.

Colorado ADC (May 21-24, 1995)

During the Colorado site visit, I visited four of the five SEPUP teachers. I interviewed three teachers and one principal. I also interviewed the ADC Director, John Sepich, who teaches at M. Scott Carpenter Middle School. I spoke with students in all of the classes either as a whole group or as I observed them working on activities. The moderation session was held on the last day of my visit and consequently I was not able to confer with the participants in setting the itinerary for my school site visits. I conducted the focus group before the moderation process because the group was going to moderate two activities and I needed to leave for the airport. I was able to observe one complete moderation cycle before I had to leave.

The Colorado ADC is organized quite differently from the two previous examples, Alaska and Kentucky. Colorado's teachers are all in different schools and in different districts. The ADC Director is a teacher not a district representative, which has limited his power to move the group forward. For example, this group never met for full days, they typically met in the afternoon after having taught half the day. This was a drawback mentioned by some of the teachers, because as one said, they came to the moderation meeting already tired. The ADC Director attempted to support the group and bring them together by establishing a Voice Mail system. He would leave messages and updates weekly on Voice Mail, and teachers could leave questions or concerns when they called to check in. The Voice Mail system worked for those who used it, but it was not equally used by all. In fact, John said that one person never used it at all. There are many individual differences among the teachers and their schools. However, the fact that there was not more time spent together to bond and to be supported in developing their understanding of the assessment system contributed to a general lack of confidence in the benefits of this approach. One teacher called it a "waste of time" compared to last year, however, John noted that this particular teacher usually came to the moderation sessions unprepared. The key point seems to be lack of time together to develop a shared understanding of the assessment system, including the prompts, the Scoring Guides and the moderation process.

Two of the teachers had taught last year during the pilot test and there were two new teachers. The ADC director also taught the course this year, but he had not taught it last year when he was the PDC director. One of the new teachers this year has a great deal of SEPUP experience. He has attended Teaching Issue Oriented Science (TIOS) training in Berkeley, has taught with CEPUP modules, and has attended alternative assessment and moderation training sessions offered by MCREL (Mid-Continental Regional Educational Laboratory). As a teacher of the course, the ADC Director felt isolated from the other teachers because of his role as director. These teachers all are committed professionals. I believe that their experience would have been very different had they come from the same school district and had more time to work together.

In Colorado, the Standards and Assessment Council has developed draft *Content Standards for Reading, Writing, Mathematics, Science, History and Geography*. John Sepich, the ADC Director and member of the Council, provided

me with a copy of the first draft of the *Colorado Model Science Content Standards* (published in February 1994 and disseminated for public comment). These standards have been aligned with the standards being developed by the National Committee for Science Education Standards and Assessment (NCSESA). NCSESA was directing the National Research Council's development of national K-12 science education standards and published a set of "guiding principles" in 1992. Colorado's draft standards for science content addresses "what every student should know and be able to do in science as a result of their study from Kindergarten through 10th grade (K-10)."

Colorado's educational system has shifted from Outcomes-Based Education to Standards-Based Education. The grading system is no longer A through F, but rather A, B and Incomplete. Students cannot fail, but must clear up incompletes to pass to the next grade level.

The draft *Colorado Model Science Content Standards* also provides examples of standards-based science activities and expectations for student performance. The draft standards are grouped by grades: K-4, 5-8, and 9-10. SEPUP addresses all the Standards, but does not necessarily cover all the areas (i.e., sub-headings under Standards), such as the Solar System. The first standard is: *Students will be able to design, conduct, and evaluate a scientific investigation.* **Designing and Conducting Investigations** is one of the backbone variables of the SEPUP course. Standard 5 states:

Students will know the usefulness of resources, and understand how applications of science, technology, and human activity impact the world.

This standard is also addressed by the SEPUP course content and two other central variables, **Understanding Concepts and Evidence and Trade-offs**. For grades 5-8, Standard 5 states:

Students in [these grades] continue to develop their understanding of resources and their uses such as energy sources, agricultural products, and rocks and minerals. There are renewable and nonrenewable resources which may be recycled and reused. Students learn that a high level of consumption of nonrenewable products can impact world supplies. Students explore the relationship between technological advancements and quality of life.

Activity 31, *Bag It! Paper or Plastic?*, in Part 2 of the SEPUP course, challenges students to design an ideal bag for the local supermarket and to identify what properties this ideal bag would have. These types of activities are designed to facilitate students' understanding of the concepts of renewable (wood/paper) and nonrenewable (world's oil reserves) resources as well as to promote higher order thinking skills such as weighing the trade-offs between choosing plastic or paper bags. Further students are challenged to identify other alternatives to depleting oil reserves or cutting down a forest. This is just one example of many embedded assessments in the SEPUP course. Although it sounds as if SEPUP fits the State Standards, John indicates that the course is not integrated enough with earth, life and physical science.

The State assessment tests will be given at grades 4, 8 and 11, beginning in 1996 with fourth grade, followed by eighth in 1997, and eleventh in 1998. There will be multiple types of authentic assessments, including performance tasks, computer-generated tasks, and multiple-multiple choice items. The assessment is being modeled after the National Assessment of Educational Progress (NAEP) and Kentucky's KIRIS.

Colorado ADC Focus Group Summary: May 24, 1995

Below the focus group questions are identified in bold followed by the response summaries.

1. Briefly describe how moderation takes place at your site.

The ADC director organizes and collects the papers to be sent to Berkeley, including quick writes. They audiotape the moderation session. John keeps track of original and consensus scores on a separate Score Report Form. They work through the process of consensus element by element. They select exemplars and complete moderation reflection forms before going on to the next activity.

The moderation proceeds in a very perfunctory fashion, much as I experienced it listening to the tapes of earlier moderation sessions. There is limited discussion and not much in-depth dialogue.

2. Is the moderation process useful in terms of:

a. learning to use the scoring guides? The teachers indicated that there is still confusion about using the scoring guides. The confusion seems to be applying the prompt in a consistent manner, so that the student work can be interpreted and scored from a common framework. They said that it did help when they looked ahead (i.e., discussed what activity they would moderate for the next meeting). By looking ahead, they were able to agree in advance on what to look for. They said that they "all teach differently so [they] had different interpretations of the prompt."

b. gaining a better understanding of student performance? The teachers said that it was useful to "see what happens in other rooms." The moderation session was a "leveling process" and they "didn't feel alone." The idea of a "leveling process" can be interpreted in the same vein as the comment made by a teacher from Alaska, that this was a "normalizing experience." In Kentucky, it was described as a process for developing and fine-tuning standards. In other words, when the teachers came together as a group they were able to look at student performance through many eyes and yet come to a shared understanding.

One teacher mentioned that it was helpful to "see how your own students compare to others." This was not necessarily a good thing, because teachers wanted to protect their own students and defend their teaching styles. Early on this created

tension for the group and although it dissipated over time, there were still some who were not able to move beyond this.

A major benefit according to these teachers is that “feedback [is] more immediate than with standardized tests.”

c. informing your instruction? One teacher said that it “can be, but we all do it so differently” that “if we got together before it might work better” (see response to 2a above). One teacher indicated that for implementation of the SEPUP course and assessment system to be effective, the district will need to be involved. In Colorado, SEPUP has been implemented more as an individual classroom change model because of the lack of a common organizational structure. Colorado has a history of strong local control for education, so even though SEPUP maps well onto the State standards for science, the change agents are at the local level.

d. enhancing your own professional development? This group seemed to focus on the differences among their students as an issue. John commented in the Director interview that these teachers spent a lot of time defending their kids. One teacher commented that “because our students are so different, [we are] looking for different things.”

The teachers did indicate that they are “interested in what others are doing” and that they “get more strategies and ideas (e.g., ABCs of Water)” from the other teachers. However, another teacher commented that “ideas may be too specific to transfer.” The group suggested that an electronic bulletin board with ideas would be helpful, then ideas could be shared with other Centers.

The Colorado ADC teachers conducted a SEPUP presentation at the Colorado Science Teacher Association’s conference, which included an assessment component.

3. What are the major advantages and disadvantages of moderation?

a. Have you modified the process at your site? If yes, why and how? The Colorado group tried to read student papers during the moderation meeting, but this took too much time, especially since they only met in the afternoon. They started mailing the papers out ahead of time, so that teachers had the opportunity to read and score before they came to the meeting.

b. How could the process be improved? The teachers indicated that the prompts are not inclusive enough to get at all that is required in the Scoring Guides. In other words, the expectations for student work is not always clear enough in the prompts, and thus the responses do not mesh well with the Scoring Guides, making interpretation and scoring difficult. Therefore, the teachers feel that either the prompts need to be edited or the Scoring Guides need to be clearer.

What changes have you instituted that you consider successful? None were instituted.

4. In regards to the overall assessment system, what are the salient issues for your ADC?

Is the assessment system a good idea? Are we on the right track? As it stands these teachers do not feel that they can assess group interactions. They mentioned that one district is using “think pads” to assess group processes.

What works best? These teachers’ feelings are mixed about the assessment system. Some believe that we are on the right track; these are the teachers who have had a lot of experience with the SEPUP philosophy and alternative assessment. The other teachers are less sure that this is the right direction.

The teachers do agree that this type of assessment is “not as stressful for students as tests” can be. The embedded assessments are viewed positively.

These teachers “want to know how to compare to others” and they feel that “having consistent Scoring Guides is good.” However, they “need exemplars to hint at what to include in responses.”

What are the barriers? The major barrier is that of time, or rather the lack thereof. Another issue that hinges on time is the feeling the teachers had that they needed to do multiple scoring to meet the demands for grades as well as the assessment scores. Tracy said that by the fourth quarter she put assessment scores in her gradebook and that was more effective with her students.

Geree indicated that SEPUP is “hard to fit into [her] district’s outcomes” because her school has prescribed outcomes for grade 8 that are not completely met by the SEPUP course.

John indicated that it “would be nice to have another year to field test the assessment, then we could work on creating hints or exemplars.” Another teacher responded that “we don’t know if the assessments really work.”

Some teachers reported that they needed more training ahead of time, including an overview. Unfortunately, John was the only teacher who was able to attend the ADC training conference last summer.

What would be the biggest obstacle(s) for new teachers using the assessment system (i.e., new to SEPUP not necessarily a beginning teacher)?

According to the Colorado teachers, the biggest obstacles for teachers encountering the SEPUP assessment system for the first time would be: the prompts; the need for additional time (e.g., for grading and preparation); the need to integrate scores with district grading policies; and the varying backgrounds of students coming into the class.

The other responses to this question clearly indicate that these teachers see the need for a lot of staff development to prepare a teacher to use the SEPUP assessment system. They indicated that training was needed to understand the workings of the program (e.g., the activities and labs to the quickchecks and formal assessments); the philosophy of the program and of the assessment system; and they

need time to assimilate what they have learned. One teacher commented that it was difficult to do a “full blown lab the first time” without training.

This group felt that they needed an earlier training meeting with the whole group. They said that it “helped once we knew what the required assessments were.” They also felt that “we tried to assess too much at one time.”

5. Is moderation a feasible method for your site to continue to use after funding ceases? What can you adapt and use in the future?

This group was emphatic that they would not be able to continue without funding, because there would be no time off allowed for this activity. Some felt that the “assessment was not meaningful enough” for them to continue, however, they all agreed that “a lot of assessment would be used individually.”

One adaptation that was noted was that they could use the Scoring Guides to “show students where the points come from,” so that the students could use the Scoring Guides to improve their skills.

6. Is it necessary to have someone in the Director’s role to make this work?

This group was emphatic that the director’s role is important and that this was a good “model of support.” They responded “Yes, absolutely!” to this question. The teachers indicated that in the future this needs to be organized at the district level. The teachers indicated that it would be helpful to get a list of users to share experiences.

Colorado Site Visit Notes

The following is a summary of the school site visits. Both the teacher and the school are identified. Context factors are described that provide a framework for understanding the implementation of the field test at each site.

John Sepich: M. Scott Carpenter Middle School, Denver, CO

John is the ADC Director and he also taught the SEPUP course to seventh graders. Last year he was the PDC director, but did not teach the pilot version of the SEPUP course. I met with John on Sunday evening to go over the itinerary for my site visit. Things were a bit less organized for this visit than the others, owed in large part to the different organizational structure of this ADC. For example, John had me visit his class on Monday and Mary Ann’s on Tuesday, but he didn’t have his SEPUP target class until Tuesday and Mary Ann’s last day to teach SEPUP was on Monday. This site visit ended with the moderation session whereas my other visits began with moderation, which was helpful in terms of confirming site visit itineraries.

At M. Scott Carpenter Middle School classes begin at 9 a.m. and school is not out until 4 p.m. I arrived shortly after 9 a.m. and checked in at the office to obtain a student escort to John’s room. John’s school serves a lower socioeconomic

neighborhood and security is a bigger issue than at other schools (e.g., Mary Ann's school is in an affluent neighborhood).

I talked to John's students briefly because they had done SEPUP this year, but did not stay to observe the class because they were going to dissect a frog. Compared to other science they have taken, these students liked the fact that SEPUP was not a text book course. They said that "they liked the drawings." The students' comments about what they liked and disliked are presented in Figure 6.

Figure 6. Comments from John's Students

John's principal was not available for the post interview.

I met with John late Tuesday afternoon to do both the ADC Director and teacher interviews. He confirmed his lack of power in the ADC Director role because the teachers are in five different school districts, therefore he has not been able to be as effective as perhaps a District Coordinator would be. He said that over time his group has reduced the amount of disagreement and increased their willingness to compromise during moderation. John has made his best efforts to keep the group organized this year, but he feels that there was less camaraderie this year among the teachers.

Since John was new to teaching the SEPUP course this year, he indicated that there was a lot of time spent in reading and preparation. John said that the time issue is a "training problem." He feels that it would be helpful to take teachers through the course activities as if they were students. Another challenge that he faced as a new teacher was the packaging of the materials. Since everything for each Part came in one box, he then had to spend time pulling things to use. He feels the packaging needs to be designed to facilitate ease of use. He said that without his prior involvement in the SEPUP course as PDC director, he "would have been overwhelmed with the bulk of written materials and activities."

Mary Ann Hart: Mandalay Middle School, Westminster, CO

Given my scheduling experience on Monday,⁴ I decided to call Mary Ann on Monday evening to confirm the time to visit her class on Tuesday morning. It was then that I found out that her last day to teach SEPUP was on Monday; they did the House of Cards activity. Her last day of school was Friday, May 26th. She had just received the post tests from John the week before, so she said that she would not be able to do the post tests. I begged her to at least do Post Test B, the student survey, and the last I heard she was going to do that.

At Mandalay classes begin at 7:20 a.m., so I was at Mary Ann's school very early Tuesday morning. Mary Ann's class had a presenter from the Public Service (local utility) Company. She had pre-selected six of her target students for me to

⁴ I am referring to the fact that I was supposed to visit Geree in the afternoon, but she had not returned John's calls and she did not return my call from Monday morning, so I did not go to her school.

interview, then I interviewed her during the next period. The students' comments about what they liked and disliked are presented in Figure 7.

Figure 7. Comments from Mary Ann's Students

When asked how SEPUP compares to other science classes that they have had, they had the following comments:

- they do a lot more hands-on rather than reading from a text;
- “didn't learn anything last year;”
- the reading is more relevant than from a text;
- they liked the visuals in the Student Book and the format was easy to follow;
- SEPUP is not boring like other science;
- “do things that we can relate to;” and
- last year they had to do four projects per quarter but this year there were no projects.

Interestingly, these students were doing projects without realizing it. Mary Ann mentioned that Waste Hierarchy was a month-long project; the results of which were posted on the board. Mary Ann does not assign homework; this way she does not lose any of the class set of student books. Students have to come in after school to make up work or to finish up an assignment.

Her principal changed mid-year; the one I had spoken with last fall had moved over to District Administration. The current principal is only interim, retiring at the end of this year, therefore I did not do a principal interview. Mary Ann is very negative about moderation. In our interview, it was clear that she does not see any value to cooperatively assessing student work.

Terry Strahm: Brighton High School, Brighton, CO

I drove out to Terry's school in rural Brighton to observe his SEPUP class at 11 a.m. on Tuesday. He was giving his class Post Test B, so I talked to the students as a whole class before he administered the test. He planned to give the Post Anchor on Thursday. He also noticed that the last question on Post Test A and the Post Anchor are identical (i.e., the electric car scenario).

Terry teaches SEPUP to ninth graders. They meet every other school day for 90 minutes; they call it a “red and white day” schedule. He splits the class in half, so that half are working on computers (he has at least a half dozen computers in his class tied to a network) and the other half are doing SEPUP activities, then they switch mid-class. He feels this is helpful because he then can monitor the SEPUP activities more closely with fewer students on task at one time.

The students in Terry's class kept journals this year in binders. I looked through five journals while the students took Post Test B. The journals contained the students' work for the whole year, such as lab write-ups and data tables. I noticed that Terry had assigned points and letter grades to various assignments in the binders. I think he has done a great job of keeping student journals. He had the

students pull the “required activities” from their journals the day of my visit after they finished Post Test B.

I asked the whole class about SEPUP. Students were asked how SEPUP compared to their other science classes. They feel that it is better than other science classes because it goes beyond just reading and doing vocabulary tests. They feel that SEPUP “teaches something” and that you “see the results and what’s going on in SEPUP.” They like the fact that you can work at your own pace because “that way you can understand it.”

One student commented that the course was too easy, that it did not progress in difficulty. Other students’ comments about what they liked and disliked are presented in Figure 8.

Figure 8. Comments from Terry’s Students

I interviewed Terry at the end of the school day. I also spoke with his principal briefly after school, but no interview was conducted because he had been involved in negotiations all day and was not able to meet with me.

Terry is new to SEPUP this year, but he has gone through TIOS and CEPUP modules, so he was comfortable with the course this year. Some of the challenges that he faced this year as a new SEPUP teacher had to do with not having an overview early on and feeling like he did not know where he was going with the course. Since he teaches SEPUP in a different classroom than his own Chemistry room, he said that it was not always easy to find materials. He suggested that the bottle caps be labeled so that they do not get mixed up. Being new to the materials, such as the assessments and scoring guides, he felt that he needed more examples of the type of responses that were expected. He found it difficult using the Scoring Guides to assess student work. He noted the problems that he had included: “not sure if it assesses all that I want to know;” difficult to distinguish between levels at times; and the descriptors on some score levels were confusing.

Terry noted that his students who had had CEPUP modules in earlier grades did better. These students liked the writing in SEPUP better than the CEPUP worksheets. He said that his students really enjoyed expressing their own opinions and feelings in SEPUP activities. In the future, he would like to include more class discussions and presentations.

The class size shrank significantly; he lost 15 of 38 students. However, about half of the class at the beginning had failed ninth grade physical science the year before. The parents are positive about the course and like the fact that the students are learning about decision making and doing hands-on activities.

Tracy Schuster, Vantage Point Campus, Thornton, CO

Tracy teaches at an alternative secondary school that serves grades 7-12. The students are very high risk; they are on probation, pregnant teens, or one stop before going to jail. This school functions on a college schedule, but the SEPUP class meets five days a week. However, the students change classes quarterly, so Tracy has not

had the same students all year. Some students take her class for more than one quarter because they like her so much and she makes science interesting and school a tolerable place to be. Tracy also taught the SEPUP course last year as it was being developed and pilot tested.

On Wednesday morning, I observed Tracy's first two periods of SEPUP. They were working on Activity 49. They had done Activity 50, the House of Cards the day before and were reviewing the results at the beginning of the class, then Tracy went back to Activity 49 to discuss heat transfer. I was impressed with the discussion and the students' dialogue with Tracy. This is an extremely high risk group and many displayed an understanding of energy and heat transfer.

I talked to both classes of students. The second class ran out of time and had to leave, but the first class had time to compare SEPUP to other science classes. This class said that SEPUP was different because it was "easier to understand," "you learn a lot of everything," "it keeps your interest," and you learn things that you "will use later in life." The students' comments for both classes (duplicate comments are not repeated) are presented in Figure 9.

Figure 9. Comments from Tracy's Students

The principal interview was shortened because he had to go off campus for a meeting, so I asked what I felt were the most pertinent questions.⁵ Tracy's principal, Tom Mordue, is very enthusiastic about SEPUP and its value for the type of students who end up at Vantage Point. He said that Tracy "speaks highly of the program." He believes that Tracy is an excellent teacher and the program is a good package for these high risk students. The course keeps the students engaged and he said it is "helpful to our students who need hands-on activities." He likes the assessments because he feels that this will help the students in their own self-evaluation, which is a goal for his school because they are using a Student Learning Profile.

The teacher interview was not completed because there was not time before the moderation session. This interview will be done by telephone.

According to the ADC director and the teachers, Tracy was the most likely person to call if they needed assistance in teaching SEPUP. She was always ahead of the rest and John said that "she worked through problems and shared with us."

Tracy is not able to attend the conferences in California because she works two jobs to "pay off college loans." She lives in Boulder and commutes to work each day. She also works for *Bota of Boulder*, stringing Bota bags. This summer she will be teaching summer school classes.

She is really a wonderful teacher to observe; she has great command over these high risk students, who apparently "walk all over" some teachers. The students range in grade from 7-12, and have reading abilities ranging from second grade to postsecondary. She sits Indian fashion (see photo in portfolio) on her desk as she reads through the Student Book out loud with the students, and engages them in discussion to determine if they understand the energy concepts in this

⁵ The principal had the interview on his calendar as 11 a.m., but that was the time to meet with the whole ADC group to conduct the focus group, followed by the moderation process.

section (i.e., heat transfer). She does an excellent job of integrating the history of the ice box with the discussion about heat transfer, and has a drawing on the board for the students to copy down and make notes on. I really had the sense that she is getting through to these students.