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Jefferson County Public Schools Collaboration In Math  
and Science (CIMS) MSP 2009 Preliminary Report to  
Kentucky Department of Education

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# **Mathematics Report**

## **Mathematics Project Design Summary**

Twenty-two Jefferson County Public School (JCPS) high school mathematics teachers participated in the CIMS initiative during the 2008-2009 school year during which they received intensive professional development from JCPS and University of Louisville faculty members in a partnership designed to help teachers improve college algebra instruction for JCPS students. Key aspects of the CIMS program are highlighted in Table 1.

Table 1

Key 2008-2009 CIMS Mathematics Program Highlights

JCPS specialist, resource/master teachers and U of L faculty held meetings to identify and align content, review curriculum materials, develop problems and activities reflecting best practices, and develop pre/post tests and observational tools.
JCPS Assistant Superintendent, principals, district specialist, and U of L faculty recruited and selected 22 mathematics teachers. Control Group teachers (17) were identified.
Teachers (including control group) took the content and pedagogy pre-test. Students (including control group) took the content pre-test.
JCPS specialist, resource/master teachers, and U of L faculty used teacher pre-test data to inform professional development and graduate course (on-line and summer seminar) design.
Teacher professional learning communities co-facilitated by U of L faculty, JCPS specialist, and resource/master teachers met 5 days (35 hours) throughout the school year (subs provided) to deepen content knowledge by: <ul style="list-style-type: none"> <li>• analyzing rich, applied problems and identifying a variety of strategies for solving</li> <li>• identifying common student misconceptions and pedagogical strategies to address them</li> <li>• selecting common formative assessments that will be used as a basis for discussion about student content understandings</li> <li>• developing scaffolded questions for use during student investigations</li> <li>• analyzing alignment of curriculum to Program of Studies and Kentucky Core Content.</li> </ul>
Teachers participated in online learning communities (10 hours) throughout the school year facilitated by U of L faculty, JCPS specialist, and master/resource teachers for continued support of curriculum implementation. In this job-embedded PD, teachers shared problems, lessons, teaching strategies, technology support, questions, successes, and concerns in a community group in JCPS Online.
Principals and assistant principals (31) attended professional development designed to help them support inquiry based instruction. Principals learned how to use the observational tool to provide constructive feedback to teachers.
U of L faculty, JCPS specialist, and principals made classroom visits and used the observational tools to measure teacher pedagogical growth and identify content/instructional needs.
Specialist and resource teachers attended NCTM conferences to identify materials and strategies to support teacher graduate course and high school math courses.
U of L faculty, JCPS specialist, and master/resource teachers taught 5 day culminating summer seminars. In mathematics the focus was on the higher level mathematics that supports and extends the algebraic content in the high school course. In addition, teachers improved pedagogical content knowledge while continuing to work with rich applications. Teachers had opportunities to analyze student misconceptions and develop better questions for classroom use. Math and science teachers collaborated to collect, analyze, and interpret data from science applications using technology. (35 hours)
Teachers (including control group) took content and pedagogy post-test. Students (including control group) took content post-test.
District specialist and resource teachers provided leadership training for teachers. In this session (6 hours), the teachers created pacing guides for College Algebra and Honors College Algebra using the book that they selected. The pacing guides included core problems, support websites, and technology applications. All pacing guides and support materials created by teachers and facilitators were placed in a community group folder that will be opened to all College Algebra teachers for the next school year.

## Goals

The overarching goal of the math component of CIMS is to increase the content and pedagogical content knowledge of high school mathematics teachers as a means of increasing student achievement.

### *Achievement of Goals and Evidence*

#### Teacher Data

To support analysis of the projected outcomes, a control group of high school mathematics teachers was actively recruited through multiple flyers, emails, peer, resource teachers, and principal recommendations. This yielded 12 teachers who completed their responsibilities (i.e., completing all teacher and student pre-post-tests) as controls in return for a payment of \$80.00.

Major teacher findings are shown in Table 2.

Table 2

CIMS 2008-2009 Mathematics Teacher Findings

MEASURES/STRATEGIES	CURRENT FINDINGS
<p>1. Measure successful completion of College Algebra courses for MSP teachers only.</p> <p>2. Compare pre-post tests of college algebra content knowledge and pedagogy.</p> <p>3. Use attitudinal survey to assess teacher self-ratings of competence in teaching the subject matter and leadership.</p> <p>4. JCPS/University Team collect data on teacher pedagogy in mathematics using observation instrument developed by JCPS content specialists. (MSP group only)</p>	<p>1. Twenty-two teachers successfully completed the CIMS math program. One teacher did not complete the content post-test because of a scheduling conflict. This teacher did complete the teacher portion of the CIMS professional development.</p> <p>2. A one-way Analysis of Variance (ANOVA) on the content pre-post test showed a statistically significant difference between the control (N=13) and participant (N=21) groups; <math>F(1, 33) = 23.2, p &lt; .001</math>. The significant difference remained when participants were randomly eliminated from the analysis to make the size of both groups equal. The average pre-post test gain for CIMS participants was 14.1 points vs. 1.1 points for the control group.</p> <p>3. A one-way Analysis of Variance (ANOVA) on the teacher survey between the control (N=12) and the treatment groups (N=21) showed a significant difference on overall post-test gains; <math>F(1, 33) = 11.2, p = .002</math>. A paired samples t-test showed significant positive pre-post changes for the treatment group on 7 of the 10 survey items at <math>p \leq .05</math> in answering the following questions: How well prepared are you to do the following for our CIMS course?: (a) Use pedagogical strategies to address common student misconceptions; (b) Develop scaffolded questions to move students to higher levels of thinking; (c) Facilitate student investigation using appropriate questioning to extend focus; (d) Facilitate student discourse to promote conceptual understanding; (e) Use my math or science content knowledge to develop students' higher level conceptual understanding; (f) Use my knowledge of inquiry-based pedagogy to develop students' higher level conceptual understanding; (g) Plan/present professional development for teachers new to CIMS courses. The following items did not show a significant difference: (a) Recognize common student misconceptions; (b) Use student work to make informed decisions about subsequent instruction; (c) and Use common formative assessments to measure student understanding of content.</p> <p>4. The CIMS JCPS/University of Louisville team collected observation data on randomly selected CIMS mathematics teachers. These data were shared with the program managers and used to make program refinements.</p>

Student Data

Student data is provided in Table 3.

Table 3

CIMS Student Math Findings

MEASURES/STRATEGIES	CURRENT FINDINGS
<p>1. Compare pre-post tests of content knowledge.</p> <p>2. Compare successful completion of mathematics courses between control and experimental groups.</p> <p>3. Compare ACT math scores between control and experimental groups of junior students and those seniors who retake the ACT their senior year. Use junior year ACT scores as baseline (covariate) for seniors.</p> <p>4. Compare KCCT math scores between control and experimental groups of junior students.</p>	<p>1. An ANOVA did not show any significant difference between the participant(N = 311 ) and control groups (N = 215), <math>F(1, 525) = .013, p = .91</math> for pre-posts comparisons of content knowledge administered in fall and spring.</p> <p>2. A Chi-Square analysis did not show any significant difference between the participant (N = 489) and control(N = 297)groups for successful completion of mathematics courses, <math>\chi^2(1, N = 524) = .42, p = .66</math>. Measured at end of year.</p> <p>3. An ANOVA showed a significant difference between the participant (N = 422; M=17.03) and control groups (N = 261; M = 18.02) for ACT scores <math>F(1,682) = 12.92, p &lt; .001</math> with the control group showing higher ACT scores on Math. Measured in spring.</p> <p>4. An ANCOVA using sex, race, and socio-economic status as covariates did not show any significant difference between the participant and control groups, <math>F(1, 317) = .65, p = .42</math> on the math component of the KCCT. The average KCCT math scale score for the CIMS group (N=134) was 1134.84 while the control group (N=184) averaged 1137.15. Measured in spring.</p>

### ***Strategies, Structures, Activities, and Lessons Learned that Support CIMS Goals***

Analysis of the teacher data support the hypothesis that professional development geared toward pedagogy and content will better prepare teachers to deliver instruction focused on college-level algebra. Teachers significantly outperformed a control group on both a survey designed to assess teacher ratings of ability and knowledge regarding pedagogy and content. These findings suggest that providing professional development to teachers in a professional learning community setting in partnership with University content faculty is an effective strategy to use in preparing teacher to deliver new content.

In terms of the evaluation, a key lesson learned is that including a control group in the design of the study is important but the challenge of recruiting control teachers is considerable. An improvement in a future initiative is to make sure that incentives offered for participation are highly valued (not necessarily only monetary). For instance, in addition to monetary payment, CIMS control participants were guaranteed first consideration for participation in Year 2 of the program. Several control participants took advantage of this incentive.

Co-planning with JCPS staff and University of Louisville faculty was very successful. The only difficulty we had was finding time to meet with the classroom teacher to plan. Next year we may try to use more than one classroom teacher in the planning and teaching components of CIMS. U of L faculty learned about strategies being used in high schools. High school teachers learned about content expectations of the university. In the final evaluations, several teachers mentioned that the visit from the chair of the university mathematics department was one of the most valuable aspects of CIMS. The CIMS teachers have developed a very strong College Algebra course aligned with the new standards from the Mathematical Association of America.

### ***Explanation of What is Not Working***

Because there was not an over abundance of teachers agreeing to serve as controls, it was not possible to match teachers on demographic characteristics.

Unfortunately, this limitation may have affected analysis of the student outcome data. Comparisons of pre-test differences on both the survey and content test showed no significant differences between the teacher groups but no analysis of student data yielded a significant treatment effect. Other student data limitations that may have affected the analysis include different schedules between schools (i.e., semester vs. trimester), different courses between teachers (some teachers only taught Algebra II, not College Algebra), and measurement error with teacher

administered content tests. Measuring student outcomes at the same time that the teachers are expanding their content knowledge and learning new pedagogy may not allow an adequate amount of time for teachers to develop skills likely to affect student outcomes. A better design might be to measure a teacher's student outcomes one-year after the teacher completes the CIMS program. Typically, program evaluation requirements prevent this type of measurement latency. It also may be better if student outcomes are only considered if the student was in a teacher's class for the whole school year. At least one-third of the students switch teachers every trimester.

We had some difficulty getting principals to return the observational tools. However, district resource teachers made a significant number of class visits. Their observational tools were used to identify teachers' needs and were used to plan the CIMS PD.

Math teachers requested more time sharing lessons and technology strategies with the science teachers. We will plan for more time with math and science teachers working together in year 2.

### *Next Steps*

- The survey items not showing significant pre-post gains for the participant groups each had formative assessment as a common factor. Fortunately, JCPS is actively pursuing new approaches to conducting formative assessments of student work. Given the self-ratings of participants and district focus, CIMS math personnel will delve into formative assessment more deeply with CIMS participants in 2009-10.
- The participating teachers developed a strong professional learning community from their CIMS experience this year. We would like to provide an opportunity for them to continue to learn from each other. They expressed the desire to be able to visit each other's classroom which is often difficult in our large district due to travel time and substitute teacher availability. Therefore, we plan to distribute the flip cameras to teachers so that they can video snippets of lesson components such as the exploration phase, whole class discourse during the explain phase, or use of formative assessment strategies during the evaluate phase. These videos would be shared with other College Algebra teachers through JCPS Online. Threaded discussion in JCPS Online on the shared lessons could continue through next year with the CIMS teachers and other College Algebra teachers in the district.
- We already have 24 teachers registered for the second year of CIMS. The teachers will be developing the new Applied Mathematics course for seniors.

# Science Report

## Science Project Design Summary

Fifteen Jefferson County Public School (JCPS) high school science teachers participated in the CIMS initiative during the 2008-2009 school year during which they received intensive professional development from JCPS and University of Louisville faculty members in a partnership designed to prepare teachers to deliver the physics component of integrated science to JCPS students beginning in the 2009-2010 school year. Key aspects of the CIMS program are highlighted below in Table 1.

Table 1

### Key 2008-2009 CIMS Science Program Highlights

JCPS specialists, resource/master teachers and U of L faculty held meetings to identify and align content, review curriculum materials and develop/identify pre, post-tests and observational tools.
JCPS Assistant Superintendent, principals, district specialists, and U of L faculty recruited and selected science teachers. Control Group teachers were identified.
Teachers (including control group) took content and pedagogy pre-test. Students (including control group) took content pre-test.
JCPS specialists, resource/master teachers and U of L faculty used teacher pre-test data to inform professional development and graduate course (on-line and summer seminar) design.
Teacher professional learning communities co-facilitated by U of L faculty and JCPS specialists, resource/master teachers met 5 days (35 hours) throughout the school year (subs provided) to deepen content knowledge by: <ul style="list-style-type: none"><li>• analyzing rich, applied problems and identifying a variety of strategies for solving</li><li>• identifying common student misconceptions and pedagogical strategies to address them</li><li>• selecting common formative assessments that will be used as a basis for discussion about student content understandings</li><li>• developing scaffolded questions for use during student investigations</li><li>• analyzing alignment of curriculum to Program of Studies and Kentucky Core Content.</li></ul>
Teachers participated in online learning communities (10 hours) throughout the school year facilitated by UofL faculty and district/master resource teachers for continued support of curriculum implementation. This job-embedded PD included sharing of problems, teaching strategies, questions, successes, and concerns. Science teachers were supposed to participate in NSTA online SciPacks content programs.
Principals (31) attended professional development designed to help them support inquiry based instruction. Principals learned how to use observational tool to provide constructive feedback.
U of L faculty, JCPS specialists, and principals made classroom visits and used the observational tools to measure teacher pedagogical growth and identify content/instructional needs.
Master/resource teachers were to attend NSTA conferences to identify materials and strategies to support teacher graduate course and high school math courses.

U of L faculty, JCPS specialists, and master/resource teachers taught 5 day culminating summer seminars. Teachers improved pedagogical content knowledge by continuing to work with rich applications. Teachers had opportunities to analyze student misconceptions and develop better questions for classroom use. Science teachers collaborated to collect, analyze, and interpret data using technology during one of the days of this seminar. (35 hours)

Teachers (including control group) took content and pedagogy post-test. Students (including control group) took content post-test.

District specialists and resource teachers provided leadership training for teachers. In this session, teachers planned the professional development for new teachers and set up a system for professional learning communities for other teachers not taking the university courses. (6 hours)

## Goals

### *Achievement of Goals and Evidence*

The overarching goal of the science component of CIMS is to increase the content and pedagogical content knowledge of high school science teachers as a means of increasing student achievement.

#### Teacher Data

To support analysis of the projected outcomes, a control group of high school science teachers was actively recruited through multiple flyers, emails, peer, resource teachers, and principal recommendations. This yielded 9 teachers who completed their responsibilities (i.e., completing all teacher and student pre-post-tests) as controls in return for a payment of \$80.00.

Major teacher findings are shown in Table 2.

Table 2  
CIMS 2008-2009 Science Teacher Findings

MEASURES/STRATEGIES	CURRENT FINDINGS
<p>1. Measure successful completion of college level Physics courses (MSP group only).</p> <p>2. Compare pre-post tests of content knowledge and pedagogy.</p> <p>3. An attitudinal survey will assess teacher self-ratings of competence in teaching the subject matter and leadership. Pre-post test performance on on-line tool such as NSTA'S SciPacK will be compared (MSP group only).</p> <p>4. JCPS/University Team collect data on teacher pedagogy in content area using observation instrument developed by JCPS content specialists. (MSP group only).</p>	<p>1. Fifteen teachers successfully completed the CIMS science program. One teacher did not complete the survey.</p> <p>2. A one-way Analysis of Variance (ANOVA) failed to show a statistically significant difference between the control (N=9) and participant (N=15) groups on the pre-post content test. Approximately 50% of teachers from the treatment and control groups showed a pre-post gain.</p> <p>3. A one-way Analysis of Variance (ANOVA) on the treatment (N=14) and the control groups (N=9) approached a significant difference on overall item gains for the teacher survey; <math>F(1, 22) = 2.02, p = .057</math>. On a 4-point scale ranging from "Not Well Prepared to Well Prepared", the treatment group ratings increased an average of .65 points (i.e., 2.13 vs. 2.78). A paired samples t-test showed significant positive pre-post changes for the treatment group on 7 of the 10 survey items at <math>p \leq .05</math> in answering the following questions: How well prepared are you to do the following for our CIMS course: (a) Use pedagogical strategies to address common student misconceptions; (b) Use pedagogical strategies to address common student misconceptions; (c) Facilitate student investigation using appropriate questioning to extend focus; (d) Facilitate student discourse to promote conceptual understanding; (e) Use my math or science content knowledge to develop students' higher level conceptual understanding; (f) Use my knowledge of inquiry-based pedagogy to develop students' higher level conceptual understanding; (g) Plan/present professional development for teachers new to CIMS courses. The following items did not show a significant pre-post difference: (a) Develop scaffolded questions to move students to higher levels of thinking; (b) Use student work to make informed decisions about subsequent instruction; and (c) Use common formative assessments to measure student understanding of content.</p> <p>4. The CIMS JCPS/University of Louisville team collected observation data on randomly selected CIMS science teachers. These data were shared with the program managers and used to make program refinements.</p>

## Student Data

Student data is provided in Table 3.

Table 3

### CIMS Student Science Findings

MEASURES/STRATEGIES	CURRENT FINDINGS
1. Compare pre-post tests of content knowledge.	1. A One-Way ANOVA showed significant differences between the control and participant groups $F(1, 359) = 4.39, p \leq .05$ on the content knowledge assessment. The average gain for CIMS participants was .69 points ( $N = 193$ ), compared to .15 points for the control group ( $N = 167$ ) Measured fall and spring.
2. Compare successful completion of integrated science courses between control and experimental groups.	2. A Chi-Square analysis found a significant difference between the participant and control groups for percentage of students successfully completing the trimester/semester of participation. $\chi^2(1, 359) = 34.03, p \leq .001$ . A greater percentage of students from the control group ( $N = 167$ ) were assigned a passing grade resulting in a pass-rate of 91% for the control group compared to 65.1% compared for the CIMS group ( $N = 192$ ). Measured end of year.
3. Compare ACT Plan science scores between control and experimental groups of sophomores.	3. A One-Way ANOVA on the ACT Plan science data did not show any significant differences between the control ( $M = 83.5, N = 166$ ) and participant ( $M = 80.2, N = 194$ ) groups, $F(1, 359) = .864, p = .36$ . Measured fall.

### *Strategies, Structures, Activities, and Lessons Learned that Support CIMS Goals*

- On-line component: We developed an on-line professional learning community rather than use SciPacks for four reasons: 1) to actively engage teachers during the school-year lapses between our 5 release days in order to maintain interest and momentum; 2) to develop a forum for teachers to discuss the assigned readings from *Stop Faking It: Force and Motion*; 3) to emphasize the importance of scientific thinking, writing, and discourse in the development of conceptual understanding; and 4) to provide additional formative assessment evidence of continued misconceptions or unanswered questions to guide our next steps planning and allow us to provide detailed feedback.
  - Lesson learned: Use JCPS on-line next year as a vehicle for this component to keep responses sequential and the follow-up comments aligned to responses. Share the load for feedback responsibility among presenters as this required far more time than expected.

- Co-planning and facilitation: The U of L and JCPS collaboration strengthened as the year progressed. We met regularly and gained expertise in maintaining a balance between engaging teachers in exploration and using questioning and discourse to move teachers to understanding, as opposed to traditional university lecture. We were able to maintain a university level of content rigor in a predominantly inquiry-based learning environment focused on our JCPS Integrated Science IA curriculum (Active Physics). Using the high school curriculum seemed to help develop a safe environment for teachers to openly explore and discuss their understanding and unveil their misconceptions and questions. Our team of course developers/presenters also found we learned from one another. Dr. Hoston, our U of L physics professor partner, benefited from seeing best practice pedagogy modeled; Scott Schneider, JCPS Resource Teacher, Tracy Ising, JCPS classroom teacher, and Lee Ann Nickerson, JCPS Science Specialist all benefited and enjoyed the deep content conversations we often had during our planning sessions.
  - Lessons learned: Participating teachers needed more content than was expected, including algebraic math skills which made it necessary to minimize expected integration of technology.
  - Lessons learned: Using the new Integrated Science IA curriculum as the core of our course resulted in an increase positive attitude about and comfort level with inquiry. Even the district's most vocal opponent of the curriculum, after his experiences within CIMS, has become convinced of the high quality and rigor of the curriculum and will use it 09-10 with his freshman classes.
- Analysis of the teacher self-reported data support the hypothesis that professional development geared toward pedagogy and content will better prepare teachers to deliver instruction focused on high school physics. These findings suggest that providing professional development to teachers in a professional learning community setting in partnership with University content faculty is an effective strategy to use in preparing teacher to deliver new content. Student data also shows a positive treatment effect on the content pre-post test. However teacher participant pre-post test data is not significantly supportive. The most likely reason for discrepant data is that most teacher participants' prior knowledge was sufficiently less than expected. The assessment tool was designed with the assumption that the teacher's foundational knowledge was at a higher level. Therefore it was not sensitive enough to reflect the actual deepening of content knowledge that occurred.
- In terms of the evaluation, a key lesson learned is that including a control group in the design of the study is important but the challenge of recruiting control teachers is considerable. An improvement in a future initiative is to make sure that incentives offered for participation are highly valued (not necessarily only monetary). For instance, in addition to monetary payment, CIMS control participants were guaranteed first

consideration for participation in Year 2 of the program. Several control participants took advantage of this incentive.

### ***Explanation of What is Not Working***

- We had some difficulty getting principals to return the observational tools. However, district resource teachers made a significant number of class visits. Their observational tools were used to identify teachers' needs and were used to plan the CIMS PD.

### ***Next Steps***

- We feel that our participating teachers have developed a strong professional learning community from their CIMS experience this year and would like to provide an opportunity for them to continue to learn from each other. They expressed the desire to be able to visit each other's classroom which is often difficult in our large district due to travel time and substitute teacher availability. Therefore, we plan to distribute the flip cameras to teachers so that they can video snippets of lesson components such as the engage inquiry phase, whole class discourse during the explain phase, or use of formative assessment strategies during the evaluate phase. These would then be shared with other teachers via our JCPS Online to allow a vehicle for them to discuss inquiry pedagogy in order to improve their instructional strategies.
- We plan to begin developing our year two Integrated Science IB course using the successful strategies from year one and at the same time making adjustments based on our lessons learned.
- The survey items not showing significant pre-post gains for the participant groups had formative assessment as a common factor. Fortunately, JCPS is actively pursuing new approaches to conducting formative assessments of student work. Given the self-ratings of participants and district focus, CIMS science personnel may want to consider delving into formative assessment more deeply with CIMS participants.

## CIMS Mathematics Participants/Partners

Group	SCHOOL	First	Last	E-Mail	Role
	JCPS	Amy	Herman	<a href="mailto:Amy.Herman@jefferson.kyschools.us">Amy.Herman@jefferson.kyschools.us</a>	Program Manager
	University of Louisville	Susan	White	<a href="mailto:Susan.White@louisville.edu">Susan.White@louisville.edu</a>	University Partner
Participant	Shawnee	T'Andrea	Mayes	<a href="mailto:T'Andrea.Mayes@jefferson.kyschools.us">T'Andrea.Mayes@jefferson.kyschools.us</a>	Teacher Leader
Participant	PRP	Mirza	Baig	<a href="mailto:Mirza.Baig@jefferson.kyschools.us">Mirza.Baig@jefferson.kyschools.us</a>	Teacher
Participant	Buechel	Richard	Berger	<a href="mailto:Richard.Berger@jefferson.kyschools.us">Richard.Berger@jefferson.kyschools.us</a>	Teacher
Participant	Central	Brenda	Bradford	<a href="mailto:Brenda.Bradford@jefferson.kyschools.us">Brenda.Bradford@jefferson.kyschools.us</a>	Teacher
Participant	Butler	Rosa	Brock	<a href="mailto:Rosa.Brock@jefferson.kyschools.us">Rosa.Brock@jefferson.kyschools.us</a>	Teacher
Participant	Fern Creek	Brian	Crumbo	<a href="mailto:Brian.Crumbo@jefferson.kyschools.us">Brian.Crumbo@jefferson.kyschools.us</a>	Teacher
Participant	Iroquois	Tonda	Dunn	<a href="mailto:Tondra.Dunn@jefferson.kyschools.us">Tondra.Dunn@jefferson.kyschools.us</a>	Teacher
Participant	Maryhurst	Dipika (Sita)	Gathani	<a href="mailto:Sita.Gathani@jefferson.kyschools.us">Sita.Gathani@jefferson.kyschools.us</a>	Teacher
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Participant	Doss	Jane	Grieb	<a href="mailto:Jane.Grieb@jefferson.kyschools.us">Jane.Grieb@jefferson.kyschools.us</a>	Teacher
Participant	Iroquois	Tim	Hucke	<a href="mailto:Timothy.Hucke@jefferson.kyschools.us">Timothy.Hucke@jefferson.kyschools.us</a>	Teacher
Participant	Seneca	Kimberly	Marshall	<a href="mailto:Kimberly.Marshall@jefferson.kyschools.us">Kimberly.Marshall@jefferson.kyschools.us</a>	Teacher
Participant	Eastern	James	Minor	<a href="mailto:James.Minor@jefferson.kyschools.us">James.Minor@jefferson.kyschools.us</a>	Teacher
Participant	Ballard	Jerry	Orange	<a href="mailto:Jeffy.Orange@jefferson.kyschools.us">Jeffy.Orange@jefferson.kyschools.us</a>	Teacher
Participant	South Park TAPP	Jeanette	Paris (Kurtz)	<a href="mailto:Jeanette.Kurtz@jefferson.kyschools.us">Jeanette.Kurtz@jefferson.kyschools.us</a>	Teacher
Participant	Ballard	April	Person	<a href="mailto:April.Person@jefferson.kyschools.us">April.Person@jefferson.kyschools.us</a>	Teacher
Participant	Male	Cynthia	Smith	<a href="mailto:Cynthia.Smith@jefferson.kyschools.us">Cynthia.Smith@jefferson.kyschools.us</a>	Teacher
Participant	Jeffersontown	Sarah	Squier (Matthews)	<a href="mailto:Sarah.Matthews@jefferson.kyschools.us">Sarah.Matthews@jefferson.kyschools.us</a>	Teacher
Participant	Manual	Kris	Tatro	<a href="mailto:Kris.Tatro@jefferson.kyschools.us">Kris.Tatro@jefferson.kyschools.us</a>	Teacher
Participant	South Park TAPP	Michael	Todaro	<a href="mailto:Michael.Todaro@jefferson.kyschools.us">Michael.Todaro@jefferson.kyschools.us</a>	Teacher
Participant	Central	Tim	Truitt	<a href="mailto:Tim.Truitt@jefferson.kyschools.us">Tim.Truitt@jefferson.kyschools.us</a>	Teacher
Participant	Jeff Cnty Virtual	Ray	Willits	<a href="mailto:Raymond.Willits@jefferson.kyschools.us">Raymond.Willits@jefferson.kyschools.us</a>	Teacher
Participant	Atherton	Craig	Winstead	<a href="mailto:Craig.Winstead@jefferson.kyschools.us">Craig.Winstead@jefferson.kyschools.us</a>	Teacher

## CIMS Mathematics Control Group

<b>Group</b>	<b>SCHOOL</b>	<b>First</b>	<b>Last</b>	<b>E-Mail</b>	<b>Role</b>
Control	<b>Seneca HS</b>	<b>Wayne</b>	<b>Adams</b>	<a href="mailto:Wayne.Adams@jefferson.kyschools.us">Wayne.Adams@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Ballard</b>	<b>Jennifer</b>	<b>Bean</b>	<a href="mailto:Jennifer.Bean@jefferson.kyschools.us">Jennifer.Bean@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Westport TAPP</b>	<b>Michael</b>	<b>Bell</b>	<a href="mailto:Michael.Bell@jefferson.kyschools.us">Michael.Bell@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Central</b>	<b>Kathy</b>	<b>Britt</b>	<a href="mailto:Kathy.Britt@jefferson.kyschools.us">Kathy.Britt@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Atherton</b>	<b>Gene</b>	<b>Brooks</b>	<a href="mailto:Gene.Brooks@jefferson.kyschools.us">Gene.Brooks@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Valley</b>	<b>Joyce</b>	<b>Charlesworth</b>	<a href="mailto:Joyce.Charlesworth@jefferson.kyschools.us">Joyce.Charlesworth@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Iroquois</b>	<b>Michele</b>	<b>Greene</b>	<a href="mailto:Michele.Greene@jefferson.kyschools.us">Michele.Greene@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Male</b>	<b>Greta</b>	<b>Heady</b>	<a href="mailto:Greta.Heady@jefferson.kyschools.us">Greta.Heady@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Seneca HS</b>	<b>Linda</b>	<b>Horstman</b>	<a href="mailto:Linda.Horstman@jefferson.kyschools.us">Linda.Horstman@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Valley</b>	<b>Silvia</b>	<b>Lister</b>	<a href="mailto:Silvia.Lister@jefferson.kyschools.us">Silvia.Lister@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Butler</b>	<b>Lynn</b>	<b>Oliver</b>	<a href="mailto:Lynn.Oliver@jefferson.kyschools.us">Lynn.Oliver@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Doss</b>	<b>Christina</b>	<b>Punches-Gun</b>	<a href="mailto:Christina.Puches-Gun@jefferson.kyschools.us">Christina.Puches-Gun@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Butler</b>	<b>Dan</b>	<b>Ruggles</b>	<a href="mailto:Dan.Ruggles@jefferson.kyschools.us">Dan.Ruggles@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Southern HS</b>	<b>Amy</b>	<b>Smith</b>	<a href="mailto:Amy.Smith@jefferson.kyschools.us">Amy.Smith@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>PRP</b>	<b>Latisha</b>	<b>Sutton</b>	<a href="mailto:Latisha.Sutton@jefferson.kyschools.us">Latisha.Sutton@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Ballard</b>	<b>Suzanne</b>	<b>Taylor</b>	<a href="mailto:Suzanne.Taylor@jefferson.kyschools.us">Suzanne.Taylor@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Southern HS</b>	<b>Mary</b>	<b>Wirth</b>	<a href="mailto:Mary.Wirth@jefferson.kyschools.us">Mary.Wirth@jefferson.kyschools.us</a>	<b>Teacher</b>

## CIMS Science Participants/Partners

Group	SCHOOL	First	Last	E-Mail	Role
	JCPS	Lee Ann	Nickerson	<a href="mailto:Lee.Nickerson@jefferson.kyschools.us">Lee.Nickerson@jefferson.kyschools.us</a>	Program Manager
	University of Louisville	Bill	Hostin	<a href="mailto:wchost@louisville.edu">wchost@louisville.edu</a>	University Partner
	University of Louisville	Rich	Christine	<a href="mailto:cvrich@louisville.edu">cvrich@louisville.edu</a>	University Partner
Participant	PRP	Tracy	Ising	<a href="mailto:Tracy.Ising@jefferson.kyschools.us">Tracy.Ising@jefferson.kyschools.us</a>	Teacher Leader
Participant	J-Town HS	Carolyn	Doucette	<a href="mailto:Carolyn.Doucette@jefferson.kyschools.us">Carolyn.Doucette@jefferson.kyschools.us</a>	Teacher
Participant	Seneca HS	Nancy	Esarey	<a href="mailto:Nancy.Esarey@jefferson.kyschools.us">Nancy.Esarey@jefferson.kyschools.us</a>	Teacher
Participant	PRP	Timothy	Flynn	<a href="mailto:Timothy.Flynn@jefferson.kyschools.us">Timothy.Flynn@jefferson.kyschools.us</a>	Teacher
Participant	Moore HS	Rodney	Gill	<a href="mailto:Rodney.Gill@jefferson.kyschools.us">Rodney.Gill@jefferson.kyschools.us</a>	Teacher
Participant	Western HS	Anna Danielle	Gleason	<a href="mailto:Anna.Gleason@jefferson.kyschools.us">Anna.Gleason@jefferson.kyschools.us</a>	Teacher
Participant	Waggener HS	Christi Hawk	Hart-Suk	<a href="mailto:Hawk.Hart-Suk@jefferson.kyschools.us">Hawk.Hart-Suk@jefferson.kyschools.us</a>	Teacher
Participant	Eastern	Becky	Loechle	<a href="mailto:Becky.Loechle@jefferson.kyschools.us">Becky.Loechle@jefferson.kyschools.us</a>	Teacher
Participant	Fern Creek HS	Elizabeth	Mansfield	<a href="mailto:Elizabeth.Mansfield@jefferson.kyschools.us">Elizabeth.Mansfield@jefferson.kyschools.us</a>	Teacher
Participant	Southern HS	Bryan	Milburn	<a href="mailto:Bryan.Milburn@jefferson.kyschools.us">Bryan.Milburn@jefferson.kyschools.us</a>	Teacher
Participant	J-Town HS	Raechel	Minor	<a href="mailto:Raechel.Minor@jefferson.kyschools.us">Raechel.Minor@jefferson.kyschools.us</a>	Teacher
Participant	J-Town HS	Gail	Sandberg	<a href="mailto:Gail.Sandberg@jefferson.kyschools.us">Gail.Sandberg@jefferson.kyschools.us</a>	Teacher
Participant	Southern HS	Randi	Stearman	<a href="mailto:Randi.Stearman@jefferson.kyschools.us">Randi.Stearman@jefferson.kyschools.us</a>	Teacher
Participant	Moore HS	Rebecca	Thompson	<a href="mailto:Rebecca.Thompson1@jefferson.kyschools.us">Rebecca.Thompson1@jefferson.kyschools.us</a>	Teacher
Participant	Buechel Metro	Angela	Yochum	<a href="mailto:Angela.Yochum@jefferson.kyschools.us">Angela.Yochum@jefferson.kyschools.us</a>	Teacher
Participant	Dupont Manual	Glenn	Zwanzig	<a href="mailto:Glenn.Zwanzig@jefferson.kyschools.us">Glenn.Zwanzig@jefferson.kyschools.us</a>	Teacher

## CIMS Science Control Group

<b>Group</b>	<b>SCHOOL</b>	<b>First</b>	<b>Last</b>	<b>E-Mail</b>	<b>Role</b>
Control	<b>Male</b>	<b>Brittany</b>	<b>Ausdenmoore</b>	<a href="mailto:Brittany.Ausdenmoore@jefferson.kyschools.us">Brittany.Ausdenmoore@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Valley</b>	<b>Amy</b>	<b>Lee</b>	<a href="mailto:Amy.Lee@jefferson.kyschools.us">Amy.Lee@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Doss</b>	<b>Jeffrey</b>	<b>Liddle</b>	<a href="mailto:Jeffrey.Liddle@jefferson.kyschools.u">Jeffrey.Liddle@jefferson.kyschools.u</a>	<b>Teacher</b>
Control	<b>J'Town</b>	<b>Elizabeth</b>	<b>Linder</b>	<a href="mailto:Elizabeth.Linder@jefferson.kyschools.us">Elizabeth.Linder@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>PRP</b>	<b>Christina</b>	<b>Locke</b>	<a href="mailto:Christina.Locke@jefferson.kyschools.us">Christina.Locke@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Central</b>	<b>Keri</b>	<b>Meador</b>	<a href="mailto:Keri.Meador@jefferson.kyschools.us">Keri.Meador@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Ballard</b>	<b>Russell</b>	<b>Moore</b>	<a href="mailto:Russell.Moore@jefferson.kyschools.us">Russell.Moore@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Valley</b>	<b>Marla</b>	<b>Paschal</b>	<a href="mailto:Marla.Paschal@jefferson.kyschools.us">Marla.Paschal@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Fern Creek</b>	<b>John</b>	<b>Saliga</b>	<a href="mailto:John.Saliga@jefferson.kyschools.us">John.Saliga@jefferson.kyschools.us</a>	<b>Teacher</b>
Control	<b>Male</b>	<b>Jeffrey</b>	<b>Wright</b>	<a href="mailto:Jeffrey.Wright1@jefferson.kyschools.us">Jeffrey.Wright1@jefferson.kyschools.us</a>	<b>Teacher</b>

**2009 Mathematics and Science Partnerships  
Budget Summary Form – Year 1**

**PROJECT: Collaborative In Mathematics and Science (CIMS)**

**FISCAL AGENT: Jefferson County Public Schools**

1	2	3	4	5
MUNIS CODE	ITEM	EXPLANATION OF EXPENDITURES	Amt. Of Grant Funds	Source & Amt. Of Matching Funds
110	Certified salary	The JCPS math and science specialists will manage the project and oversee day-to-day activities as part of their regular duties. Each person will spend an average of 5 hours/ \$52/hour x 5 hours/week x 38 weeks x 2		19,760 general funds
110	Certified salary	One JCPS math and one science resource teacher will assist with project activities. Each person will spend an average of 5 hours/week for 38 weeks. \$52/hour x 5 hours/week x 38 weeks x 2		19,760 general funds
113	Teacher Stipends	40 participating teachers will attend 6 hours of Leadership Development training as part of the required 75 hours of PD. 40 teachers x \$20/hour x 6 hours	4,800	
113	Teacher Stipends	A control group of 40 teachers not participating in the program will receive stipend pay to take the same pre and post-test that the project teachers take. 40 teachers x \$20/hour x 4 hours.	3,200	
111	JCPS co-teachers	One master mathematics and one master science teacher will plan PD and co-teach the 35 hour summer course with the UofL A&S professors. \$9,625/teacher x 2 teachers	19,250	
113/ 240	Teacher Stipends/ Tuition for UofL graduate class	Participating teachers will receive either PD pay or UofL tuition for the 35-hour summer training. Since the final slate of teachers has yet to be named, the grant is budgeting enough money for each teacher to receive tuition. If some teachers opt for stipend, the budget codes will be adjusted. 40 teachers x \$1,254 (three graduate hours at UofL)  <b>Twenty-five teachers opted to receive the stipend instead of college credit resulting in a savings of approximately \$300 per person so \$7500 was moved to Munis Code 643</b>	<del>50,160</del> 42,660	
120	Certified Substitutes	Participating teachers will have five days of release time to pursue job embedded PD. 42 substitutes x 5 days x \$120/day	25,200	

231	KTRS		6,878	
253	Unemployment		310	
260	Workers Compensation		208	
222	Medicare Match		758	
233	Other Employer Match		875	
320	Education consultant	University of Louisville A&S mathematics and science professors will collaborate with JCPS personnel to design and teach the two graduate courses.	21,532	2,779 salary & fringes 723 unrecovered F&A
320	Education consultant	Evaluation	20,000	
640	Books	<p><del>Mathematics textbook, one per teacher; 20 teachers x \$100/book</del></p> <p>18 copies of <i>Science Formative Assessment</i> at \$32.95 each</p> <p>25 copies of <i>Understanding Student Thinking, Grades 6-12: 30 Formative Assessment Probes for the Secondary Classroom</i> at \$35.95 each</p> <p>Total Before Shipping: \$1240.20</p>	2,000	
643	Books	<p>Professional books discussing misconceptions in mathematics and science <del>\$30/book x 40 teachers x 2 books</del></p> <p>(\$7500 was moved from Munis Code 240)</p> <p>18 copies of <i>Electricity and Magnetism: Stop Faking It! Finally Understanding Science So You Can Teach It</i> 18 at \$17.97 each</p> <p>18 copies of <i>Targeting Students' Physical Science Misconceptions: Using Conceptual Change Model</i> \$32.95 each</p> <p>18 copies of <i>Making Sense of Secondary Science</i> \$42.95 each</p> <p>25 copies of <i>College Algebra</i> (Larson) \$161.90</p> <p>25 copies of <i>College Algebra</i> (Blitzer) \$138.67 each</p>	<p><del>2,400</del> 9,900</p>	

		<i>Cord Applied Mathematics (One set to preview for CIMS Applied Math) (\$208.55)</i>  <i>Total Before Shipping: \$9412.46</i>		
<b>730</b>	Supplies	Graphing calculators \$120 each x 40 teachers	4,800	
<b>730</b>	Supplies	Probeware, two per teacher \$160 x 40 teachers x 2  <i>32 CBRs and 17 Lab Pros were purchased for \$4587.66</i>  <i>Additional materials for teachers: 17 Van de Graff Generators at \$159 each 17 Field Visualizers at \$139 each</i>  <i>Total Before Shipping: \$9653.66</i>	12,800	1,250 science lab materials general fund
<b>734</b>	Computers and related equipment	<i>(\$4600 will be moved from Munis Code 735)</i>  28 Flip video camcorders at \$129.00 each 28 tripods @ \$11.80 each 28 USB cables @ \$4.50 each 1 storage device at \$400.00  <i>Total Before Shipping: \$4468.40</i>	4600	
<b>580</b>	Travel	Four co-teachers to attend national conferences. \$1,500 x 4	6,000	
<b>580</b>	Travel	Mileage for four people to attend MSP training .50/mile x 100 miles x 4 people	200	
<b>610</b>	General supplies	Supplies to conduct classes - \$100/teacher x 40 teachers	4,000	
<b>810</b>	Registration	Registration for four JCPS co-teachers to attend NCTM and/or NSTA. \$275 x 4	1,100	
		<b>Subtotal</b>	<b>186,471</b>	<b>44,272</b>
<b>933</b>	Indirect cost	3.71% (JCPS approved rate)	<b>6,918</b>	
		<b>TOTAL</b>	<b>193,389</b>	<b>44,272</b>

**2009 Mathematics and Science Partnerships  
Budget Summary Form – Year 2**

**PROJECT:** Collaborative In Mathematics and Science (CIMS)

**FISCAL AGENT:** Jefferson County Public Schools

1	2	3	4	5
MUNIS CODE	ITEM	EXPLANATION OF EXPENDITURES	Amt. Of Grant Funds	Source & Amt. Of Matching Funds
110	Certified salary	The JCPS math and science specialists will manage the project and oversee day-to-day activities as part of their regular duties. Each person will spend an average of 5 hours/week \$54/hour x 5 hours/week x 38 weeks x2		19,760 general funds
110	Certified salary	One JCPS math and one science resource teacher will assist with project activities. Each person will spend an average of 5 hours/week for 38 weeks. \$54/hour x 5 hours/week x 38 weeks.		19,760 general funds
113	Teacher Stipends	40 participating teachers will attend 6 hours of Leadership Development training as part of the required 75 hours of PD. 40 teachers x \$20/hour x 6 hours	4,800	
113	Teacher Stipends	A control group of 40 teachers not participating in the program will receive stipend pay to take the same pre and posttest that the project teachers take. 40 teachers x \$20/hour x 4 hours.	3,200	
111	JCPS co-teachers	One master mathematics and one master science teacher will plan PD and co-teach the 35 hour summer course with the UofL A&S professors. \$9,624/teacher x 2 teachers	19,250	
113/ 240	Teacher Stipends/ Tuition for UofL graduate class	Participating teachers will receive either PD pay or UofL tuition for the 35-hour summer training. Since the final slate of teachers has yet to be named, the grant is budgeting enough money for each teacher to receive tuition. If some teachers opt for stipend, the budget codes will be adjusted. 40 teachers x \$1,254 (three graduate hours at UofL)	50,160	
120	Certified Substitutes	Participating teachers will have five days of release time to pursue job embedded PD. 42 substitutes x 5 days x \$120/day	25,200	
231	KTRS		6,878	

253	Unemployment		310	
260	Workers Compensation		208	
222	Medicare Match		758	
233	Other Employer Match		875	
320	Education consultant	University of Louisville A&S mathematics and science professors will collaborate with JCPS personnel to design and teach the two graduate courses.	21,456	2,862 salary & fringes 744 unrecovered F&A
320	Education consultant	Evaluation	20,000	
640	Books	Mathematics textbook, one per teacher; 20 teachers x \$100/book	2,000	
640	Books	Professional books discussing misconceptions in mathematics and science \$30/book x 40 teachers x2 books	2,400	
730	Supplies	Graphing calculators \$120 each x 40 teachers	4,800	
730	Supplies	<del>Probeware, two per teacher \$160 x 40 teachers x 2</del> Instructional materials including graphing calculators (\$130 each x 40 teachers) =, probeware, science equipment, whiteboards, and manipulatives for teachers	<del>12,800</del> 17,600	1,250 science lab materials general funds
580	Travel	Four co-teachers to attend national conferences. \$1,500 x 4	6,000	
580	Travel	Mileage for four people to attend MSP training .50/mile x 100 miles x 4 people	200	
610	General supplies	Supplies to conduct classes - \$100/teacher x 40 teachers	4,000	
810	Registration	Registration for two JCPS co-teachers to attend NCTM and/or NSTA. \$275 x 4	1,100	
	Classroom space	\$5/hour x 75 hours x 2 classes at either UofL or JCPS		750
	Custodial setup and clean up fee	\$36/hour x 75 hours		2,700 overtime general fund
		<b>Subtotal</b>	<b>186,395</b>	<b>47,826</b>

933	Indirect cost	3.71% (JCPS approved rate)	6,915	
		<b>TOTAL</b>	<b>193,310</b>	<b>47,826</b>

1/09

Justification for the Change in Budget:

We are finding that teachers need additional help with the content in math and science. We would like to buy additional books that help teachers improve their content knowledge and identify student misconceptions. These additional resources will support Objective 1 which states that..." teachers will increase their content and pedagogical content knowledge by participating in 86 hours of professional development..." These resources will be used in the PD to support the project activities as described in the grant on page 6.

Resources will include:

*Electricity and Magnetism: Stop Faking It! Finally Understanding Science So You Can Teach It* (\$17.97 each)

*Targeting Students' Physical Science Misconceptions: Using Conceptual Change Model* (\$32.95 each)

*Making Sense of Secondary Science* (\$42.95)

*College Algebra* (Larson) (\$161.9)

*College Algebra* (Blitzer) (\$138.67)

*Cord Applied Mathematics* (One set to preview for CIMS Applied Math) (\$208.55)

7/09

Justification of Additional Changes in Budget:

We are finding that teachers need additional help with the content in math and science. We would like to buy additional materials that help teachers improve their content knowledge. These additional resources will support Objective 1 which states that..." teachers will increase their content and pedagogical content knowledge by participating in 86 hours of professional development..." These resources will be used in the PD to support the project activities as described in the grant on page 6.

Purchase 1 Van de Graff Generator (\$159.00) and 1 Field Visualizer (\$139.09) per participating teacher in place of the requested probewear.

Rationale: The participating teachers' needed for more and deeper content knowledge than anticipated which resulted in our need to focus more time on content. As a result less time was available for technology applications. Most participants were not ready to learn about and then incorporate the technology into their instruction. Early in the grant our teachers investigated motion with motion rangers; we purchased a pair for each participant. Additionally our mathematics/science integration PD paired science and math teachers so that science teachers could learn calculator applications and math teachers could learn science applications. Although these two technology integrations were received favorably, when we asked teachers about further technology applications for the summer PD most were reluctant and preferred more content. The Van de Graff and field visualizer were used in conceptual stations that we developed and implemented during our summer CIMS PD. These two pieces of equipment helped our teachers

understand the concept of a field, the 3D nature of the field, and the forces that occur within a field. The stations developed can be used in the classroom with students; our teachers do not have these two equipment pieces in their schools.

Purchase *Science Formative Assessment* (Keeley) (\$32.95) for participating teachers

Rationale: Several of these strategies were used throughout the CIMS PD sessions. Participating teachers requested the book as a resource.

Purchase flip video camcorders (\$129.90 each), tripods (\$11.80 each), USB cables (\$4.50 each), and one computer hard drive (\$400) for storing videos

Rationale: Participating teachers wanted to observe other's classes to share successes and improve pedagogy. The flip cameras will be used to record class lessons to share with other teachers in lesson study discussions. These will be used by current teachers in follow up sessions next year. The cameras will also be used with the new CIMS teachers next year for the same purpose.

Purchase *Understanding Student Thinking, Grades 6-12: 30 Formative Assessment Probes for the Secondary Classroom* (\$35.95) for participating teachers

Rationale: Teachers need some additional support in the use of formative assessments to identify student misconceptions.

## **Proposed Changes for Year 2**

Instructional materials have been combined in Munis Code 730. Decisions of instructional materials will depend, in part, upon teachers' content needs.