

Engaging Students in Learning: Mathematical Practices

*Dewey J. Hansen & Helen Cothron Hansen
Memorial Fund*

Billings West High School

2201 St. Johns Avenue
Billings, 59101

cobbd@billingschools.org
O: (406) 281-5602

Mrs. Margaret Aukshun

2201 St. Johns Avenue
Billings, MT 59102

aukshunm@billingschools.org
O: (406) 281-5710

Application Form

Report Fields

Project Name*

Name of Project

Engaging Students in Learning: Mathematical Practices

Amount Requested

Amount Requested

\$18,000.00

Grade Level

Please select grade level below.

9th-12th Grade

Primary Subject Area

Please select the primary subject area of your grant.

Mathematics

School

Please select your school from the list below.

Billings West High School

Number of Students Served

Please enter the number of students that will be potentially served by this grant.

1600+

Project Cost

What is the total cost of your project?

24697

Statement of Need

Please describe the need for this project. For example, how will this project impact student learning?

In November 2011, the state of Montana adopted the Common Core State Standards in Mathematics (CCMS). In response, Billings Public Schools has been revising and creating curriculum that aligns with the CCMS at each grade level. The curriculum provides a common sequencing to facilitate teacher collaboration

at the school level. At West High, we have implemented the Algebra 1, Geometry, and Algebra 2 curriculums. In 2014-2015, we will be implementing the Algebra 3 curriculum.

CCMS includes grade-level content standards that represent a balance of conceptual understanding and skills. The Standards of Mathematical Practice describe the characteristics of mathematically proficient students, providing teachers with the guidelines for effective instructional pedagogy. The coherence of the standards within a grade and the progressions between courses make the connections among mathematical ideas explicit.

In order to realize the potential of the Common Core, teachers must have access to high-quality professional development, including opportunities to deeply understand the content and the implications for instruction of the Standards of Mathematical Practice.

The purpose of this project is to provide professional development and technologies to West High math teachers to better implement the content and practices of Common Core. West High math teacher will have the opportunity to use technology to support students. They will have the opportunity to collaborate with national authors and leaders of curriculum and instruction to provide students with engaging, powerful learning experiences. They will have the opportunity to ensure that students will deeply understand the mathematics they are learning.

As we enter the third year of implementation of Common Core, we have found our teachers have been overwhelmed with new technologies, new curriculum, and new school initiatives; they have not successfully implemented TI-Nspire technologies in their classroom. However, after last summer's workshop, they inherently understand the benefit for students to use the technology. A departmental survey shows renewed interest in attaining the technology. This project will allow teachers to gain more access to the Navigator systems; we hope to complete three more systems with this grant.

This project will also fund two professional development opportunities for our teachers. Last year, with the help of Dewey Hansen monies, we brought in lead authors of Utah's MVP project to share content from the Secondary 1 and 2 materials and teaching strategies to implement their curriculum. Most participants said the workshop was the most meaningful in their careers. This year, we will fund the same authors to share their expertise and to offer more content from their materials. We will also fund a cadre of three teachers to attend an NCTM Interactive Institute on Engaging Students in Learning in Chicago during the summer. These teachers will represent the Algebra 1, Geometry, and Algebra 2 PLC groups at West High. Each strand will experience a progression of activities to address mathematics content related to the Common Core mathematical practices and the NCTM Process Standards.

The Common Core is a living document. Teachers must learn from the Standards, build on their strengths, and identify areas that need improvement. They need the time to understand, implement, learn from mistakes, discuss, share, and thoughtfully make revisions to improve teaching. This project will allow West High math teachers to continue their evolution through classroom use of technology and staff development.

Primary Goal

Please describe the primary goal of the project and how it blends with School District 2 goals and curriculum.

The primary goal of this project is to provide professional development and classroom technologies to better implement the Common Core Math Standards and Practices (CCMS) at West High. With the adoption of the Common Core curriculum, Billings Public Schools is phasing in updated curriculum to match the Common Core standards. By 2014-2015, the content and mathematical practices for Algebra 1 through Algebra 3 will be defined and implemented by classroom teachers. The project will focus on technology and pedagogical practices to integrate content-specific activities and learning strategies that align with the CCMS. A cadre of West High teachers will attend a high-quality conference presented by the National Council of Teachers of Mathematics and share their learnings with their PLC group. Furthermore, the project aligns with the BPS High School Technology plan. With TI-Nspire technology, teachers are empowered to design a digital classroom that fuels interactive learning.

Project Description

Briefly identify the major activities and materials involved in your project.

First, we will enable teachers across the math curriculum to leverage TI-Nspire technology for reinforcement of CCMS curriculum and math practices, real-life applications of mathematical functions, improved algebraic reasoning capabilities for students, and improved assessment scores to close the achievement gap for students. With the past two year's overwhelming demands on teacher's time, West High has not successfully incorporated the use of the two TI-Nspire Navigator systems purchased with the 2012 Dewey Hansen grant. However, our teachers insist they still want to invest in this technology. This grant will increase our number of systems to five. With the mobile carts in proximity to the teachers and a technology plan at the building level to offer training specific to this technology, the use should expand to more than two teachers.

Second, the project will fund another three-day Mathematics Vision Project "Teach Like an MVP" workshop in August for district teachers. The MVP classroom experience begins by confronting students with an engaging problem and then allows them to grapple with solving it. As students' ideas emerge, take form, and are shared, the teacher orchestrates the student discussions and explorations towards a focused mathematical goal. The MVP authors (instructors) will teach the workshop with a comprehensive math framework that addresses both curriculum and implementation of Algebra 1, Geometry, and Algebra 2. Participants will experience and understand the mathematics in a developmental learning cycle, and they will learn the five practices for facilitating discourse in the classroom.

Third, the project will fund expenses for three teachers to attend the NCTM Interactive Institute Engaging Students in Learning: Mathematical Practices and Process Standards in Chicago during the summer. Participants will understand that the mathematical practices in CCMS and the mathematical processes in NCTM's Process Standards are integral to teaching. They will learn instructional strategies that enable students to experience and to develop the habits of mind of mathematically proficient students. They will examine mathematical content through the lens of the CCMS Practices, and engage in activities related to task selection, development, and implementation, both during and after the Institute.

Professional Development

If your project includes professional development, how will it improve student performance?

The project funds two professional development workshops in Summer 2014 to focus on the effective implementation of the Common Core Practices. The CCMS represent a shift toward higher levels of cognitive demand, asking students to demonstrate understanding and solve non-routine problems. Practice Standards need to be embedded in teachers' daily lessons so that students develop procedural fluency but also a deeper understanding of the content. By devoting time to professional development, our teachers learn instructional strategies that enable students to develop the habits of mind of a mathematically proficient student and practical strategies to prepare students for success.

Project Timeline

When will you implement your project?

We will immediately use the rollover funds from the 2013-2014 Dewey Hansen grant to register three teachers for the NCTM Interactive Institute for grades 9-12 and to purchase their plane fares. Rollover funds will also purchase TI-Nspire Navigator Software for 2 new systems and 6 classroom computers. Grant monies will be used to pay for travel costs for the NCTM Interactive Institute July 31-August 2. In August, we will pay our school's share of travel expenses for the presenters of the MVP "Teach Like an MVP" workshop. During mid-summer, we will purchase the computers, mobile carts, TI-Nspire handhelds, and Navigator accessories to achieve 5 mobile Navigator systems for West High. During late summer, we can assemble three Navigator systems and update our previous two sets. Once these funds have been committed, we can use remaining funds to assess our needs for professional development on Math Practices and classroom technology and prepare for our next Navigator system.

Plan for Evaluation

How will you evaluate student outcomes for your project?

We have purposely chosen the three participants for the NCTM Interactive Institute to align with our existing Algebra 1, Geometry, and Algebra 2 PLC groups at West High. During the conference, some questions for the classroom will be explored. How can educators transform the classroom to become a richer environment for students to become powerful mathematical thinkers? How do we engage learners and respond to their needs? How do educators design instructional episodes in which mathematical practices are embedded (including technology like the TI-Nspire)? How do we put the "why" into the "what" for struggling learners? This professional development opportunity can help us focus on the high-achieving actions of each PLC necessary to implement the Mathematical Practices, including using technology, into our existing classrooms. Student achievement can then be monitored through structured or informal formative assessment opportunities monitored by the PLC groups.

Project Budget

Please identify other funding sources, if applicable. You may either type or attach a budget

Our third Navigator system is almost complete because of redeemed coupons with Texas Instruments; we just need a laptop for it. Our fourth system was started with Technology mill levy funds; we need a cart, laptop, software, and Navigator system for it. This grant will purchase our entire fifth system.

Engaging Students in Learning Budget Proposal.docx

Supervisor Approval*

I have recieved approval from mysupervisor to apply for this grant.

Yes

Attachment 1

Please attach any photos, pages from catalogs, or other ducments below. This is optional.

NCTM Interactive Institute on Engaging Students Program.pdf

Attachment 2

Billings2014Signed.pdf

Attachment 3

TI-Nspire Navigator System Quotes.pdf

File Attachment Summary

Applicant File Uploads

- Engaging Students in Learning Budget Proposal.docx
- NCTM Interactive Institute on Engaging Students Program.pdf
- Billings2014Signed.pdf
- TI-Nspire Navigator System Quotes.pdf

Engaging Students in Learning: Mathematical Practices

Budget

Budget Item Description	Budget Amount
Rollover Funds at Time of Proposal \$6697	Requested Amount \$18000
3-day NCTM Interactive Institute on Engaging Students in Learning Summer Workshop July 31-August 2 in Chicago IL (see Attachment #1) • Registration costs for 3 participants • Plane fares for 3 participants • Lodging Costs for 3 nights/2 rooms • Shuttles to/from hotel • Food/3 people/4 days • NCTM books related to conference	\$1200 \$1800 \$1505 \$ 110 \$500 \$100 \$5215
• 3-day MVP "Teach Like an MVP" Summer Workshop August 11-13 in Billings (see Attachment #2)—West High's share of travel costs for two instructors	\$1050
Navigator Systems • 9 single-user licenses for TI-Nspire Navigator Teacher Software • 3 HP Elitebook 8570p Notebook (Systems #3,4,5) • 2 TI-Nspire 30-user TI-Nspire Navigator Systems (Systems #4,5)—includes access point and wireless caps for handhelds • 30 TI-Nspire CX CAS handhelds (System #5) • 2 Mobile Carts • Paid time to download software/assemble carts/connect to Navigator System	\$2993 \$2460 \$4854 \$4200 \$1000 \$400 \$15907
• Funds for possible emerging technologies as we attend conferences/future professional development as needed	\$2525
Total	\$24697



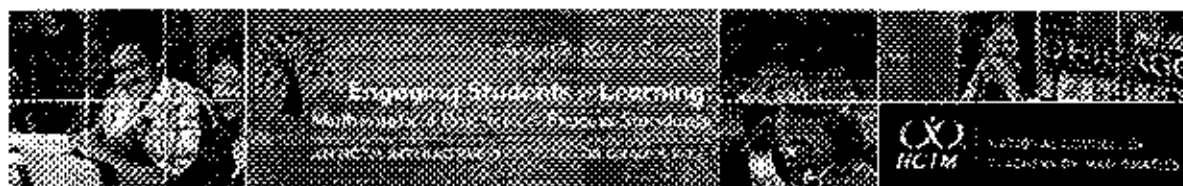
NATIONAL COUNCIL OF
TEACHERS OF MATHEMATICS

Program and Presentations

[> JOIN](#)
[> LOGIN](#)

[>](#)
[CART](#)

0 ITEMS (\$0.00)



Program & Presentations

You'll dedicate 2½ days of professional development to the Common Core mathematical practices and NCTM Process Standards, and walk away with practical strategies to prepare your students for success.

Program Overview

[Focus on Your Grade](#)
[Keynote Sessions](#)
[Who Should Attend](#)
[Breakout Workshops](#)
[What You'll Accomplish](#)
[Schedule Overview](#)
[General Information](#)

Focus on Your Grade—Pick a Strand

The experience will be suited to your interests—you'll take part in sessions and be grouped with educators according to the grade level you select for your strand of focus. Each strand will experience a progression of activities to address mathematics content related to the Common Core mathematical practices and NCTM Process Standards.

Strands

- Algebra 1/Integrated Year 1
- Algebra 2/Integrated Year 3
- Geometry/Integrated Year 2

[back to top](#)

Who Should Attend

- High school mathematics teachers
- Math coaches and teacher leaders
- High school supervisors
- Teacher educators
- Preservice teachers
- College mathematics teachers

[back to top](#)

What You'll Accomplish—The Institute's Defined Outcomes

Activities are designed for you and your peers to achieve defined outcomes together. Participants will—

- understand that the mathematical practices in CCSSM and the mathematical processes in NCTM's Process Standards are integral to teaching;
- learn instructional strategies that enable students to experience and to develop the habits of mind of a mathematically proficient student;
- examine mathematical content through the lens of the CCSSM mathematical practices, the NCTM Process Standards, and the teaching and learning standards from *Principles to Actions: Ensuring Mathematical Success for All*; and
- engage in activities related to task selection, development, and implementation, both during and after the Institute.

[back to top](#)

Keynote Sessions

Well-known mathematics leaders will address teaching, learning, and assessment related to the mathematical practices in CCSSM and NCTM's Process Standards.

Here are just a few of the exceptional speakers presenting at the institute.



Opening Session **Task, Tools, and Talk: A Framework for Enacting Mathematical Practices**

Margaret (Peg) Smith, University of Pittsburgh

In *Principles to Actions: Ensuring Mathematical Success for All* (2014), NCTM identifies eight research-inspired teaching practices that represent its accumulated wisdom regarding what constitutes effective teaching. This session will focus on describing these eight practices, discussing how they support students' learning of mathematical content and processes, and then engage participants in analyzing instructional episodes in which the practices are embedded.



Closing Session **Reflecting on Student Engagement**

Cathy Seeley, Charles A. Dana Center at the University of Texas at Austin (retired)

We will look back over the experiences of this institute and consider the opportunities and challenges for the coming year in helping students develop the mathematical habits of mind described in the Common Core Standards for Mathematical Practice and NCTM's Process Standards. How can each educator transform the classroom to become an ever-richer environment for students to become powerful mathematical thinkers?



From Knowing to Doing: Ensuring All Students Possess Essential 21st Century Competencies

Diane Briars, President-Elect,
National Council of Teachers of Mathematics (NCTM)



Classroom Formative Assessment: **Engaging Learners and Responding to Their Needs**

Dylan William,
Institute of Education, University of London

**Putting the Why into the What for Struggling Learners**

Barbara J. Dougherty,
University of Missouri-Columbia

**Building Successful High School Mathematics Programs that Support the Mathematical Practices**

W. Gary Martin,
Auburn University, AL

**Beyond The Common Core: The High Achieving Actions of PLC's!**

Timothy Kanold,
The Center for Mathematics Teaching and Learning

[back to top](#)

Breakout Workshops

Information on workshops and program presentations will be available soon.

[back to top](#)

**NATIONAL COUNCIL OF
TEACHERS OF MATHEMATICS**

Membership Works. Let us help you get results that work for you.

Join NCTM Today!
www.nctm.org/membership



Copyright © 2014, National Council of Teachers of Mathematics.

CONSULTING CONTRACT

This Agreement is made effective as of February 3, 2014, by and between Kim Anthony: Billings Public Schools, of 415 North 30th, Billings, MT 59101, and Mathematics Vision Project LLC, of 947 Greenoaks Dr., Murray, Utah 84123.

In this Agreement, the party who is contracting to receive services shall be referred to as "Billings Public Schools", and the party who will be providing the services shall be referred to as "Mathematics Vision Project LLC".

Mathematics Vision Project LLC has a background in Professional Development of mathematics educators and leaders. And is willing to provide services to Billings Public Schools based on this background.

Billings Public Schools desires to have services provided by Mathematics Vision Project LLC.

Therefore, the parties agree as follows:

1. DESCRIPTION OF SERVICES. Beginning on August 11, 2014, Mathematics Vision Project LLC will provide the following services (collectively, the "Services"): Professional development with respect to the Mathematics Vision Project (MVP) materials will be provided for the high school teachers served by the Billings Public Schools. The professional development will be provided on August 11th, 12th and 13th of 2014 and last from 8:30am to 3:30pm. The professional development will include but may not be limited to the following: An overview of the MVP materials, understanding the frameworks on which the materials are built, experience several learning cycles and tasks from the Secondary Math One and Secondary Two materials as well as addressing anxieties and difficulties that participating teachers have with regard to implementation of MVP materials and new Core Standards.

2. PERFORMANCE OF SERVICES. The manner in which the Services are to be performed and the specific hours to be worked by Mathematics Vision Project LLC shall be determined by Mathematics Vision Project LLC. Billings Public Schools will rely on Mathematics Vision Project LLC to work as many hours as may be reasonably necessary to fulfill Mathematics Vision Project LLC's obligations under this Agreement.

3. PAYMENT. Billings Public Schools will pay a fee to Mathematics Vision Project LLC for the Services in the amount of \$9,000.00. Billings Public School will also pay the travel expenses for the Mathematics Vision Project LLC. The Service fee and expenses shall be payable in a lump sum upon completion of the Services. Upon signing this agreement Billings Public Schools will begin the process of their office with regard to purchase order or payee identification. Upon completion of Services Mathematics Vision Project LLC will submit an invoice indicating the amount of service and other related expenses.

4. SUPPORT SERVICES. Billings Public Schools will provide the following support services for the benefit of Mathematics Vision Project LLC: Meeting location and other on site conveniences such as lunch and other items required by participants.

5. NEW PROJECT APPROVAL. Mathematics Vision Project LLC and Billings Public Schools recognize that Mathematics Vision Project LLC's Services will include working on various projects for Billings Public Schools. Mathematics Vision Project LLC shall obtain the approval of Billings Public Schools prior to the commencement of a new project.

6. TERM/TERMINATION. This Agreement shall terminate automatically upon completion by Mathematics Vision Project LLC of the Services required by this Agreement.

7. RELATIONSHIP OF PARTIES. It is understood by the parties that Mathematics Vision Project LLC is an independent contractor with respect to Billings Public Schools, and not an employee of Billings Public Schools. Billings Public Schools will not provide fringe benefits, including health insurance benefits, paid vacation, or any other employee benefit, for the benefit of Mathematics Vision Project LLC.

8. EMPLOYEES. Mathematics Vision Project LLC's employees, if any, who perform services for Billings Public Schools under this Agreement shall also be bound by the provisions of this Agreement.

9. ASSIGNMENT. Mathematics Vision Project LLC's obligations under this Agreement may not be assigned or transferred to any other person, firm, or corporation without the prior written consent of Billings Public Schools.

10. NOTICES. All notices required or permitted under this Agreement shall be in writing and shall be deemed delivered when delivered in person, via email or deposited in the United States mail, postage prepaid, addressed as follows:

IF for Billings Public Schools:
Kim Anthony: Billings Public Schools
Kim Anthony Curriculum Director
415 North 30th
Billings, MT 59101

IF for Mathematics Vision Project LLC:
Mathematics Vision Project LLC
Travis Lemon Member
947 Green Oaks Dr.
Murray, Utah 84123

Such address may be changed from time to time by either party by providing written notice to the other in the manner set forth above.

11. ENTIRE AGREEMENT. This Agreement contains the entire agreement of the parties and there are no other promises or conditions in any other agreement whether oral or written. This Agreement supersedes any prior written or oral agreements between the parties.

12. AMENDMENT. This Agreement may be modified or amended if the amendment is

made in writing and is signed by both parties.

13. SEVERABILITY. If any provision of this Agreement shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision of this Agreement is invalid or unenforceable, but that by limiting such provision it would become valid and enforceable, then such provision shall be deemed to be written, construed, and enforced as so limited.

14. WAIVER OF CONTRACTUAL RIGHT. The failure of either party to enforce any provision of this Agreement shall not be construed as a waiver or limitation of that party's right to subsequently enforce and compel strict compliance with every provision of this Agreement.

15. APPLICABLE LAW. This Agreement shall be governed by the laws of the State of Montana.

Party receiving services: Kim Anthony: Billings Public Schools

By: Kim Anthony Date: 2-4-14
Kim Anthony
Curriculum Director

Party providing services: Mathematics Vision Project LLC

By: Travis Lemon Date: 2-7-14
Travis Lemon
Member



QUOTE

Page 1 of 1

Valley Business Machines

2712 S. 3600 W. Suite G West Valley City, UT 84119
Ph: (801) 969-6303 Fax: (801) 969-4013

Quote Number: 0010484
Quote Date: 04/10/14
Customer PO:
Account Number: BILLINGS WEST HIGH
Salesperson: DAN TURPIN

Bill To :
BILLINGS WEST HIGH SCHOOL
2201 ST JOHNS AVE
BILLINGS MT 59102

Ship To:
BILLINGS WEST HIGH SCHOOL
MARGARET AUKSHUN
2201 ST JOHNS AVE
BILLINGS MT 59102
Buyer Phone: (406) 281-5710
Fax:
Route/Seq: FEDEX/0

Line	Item Number	Description	UOM	Qty	List Price	Price	Total
1	TEXNAVNSMPESWE	NSPIRE NAVIGATOR SOFTWARE	EA	9	0.00	332.50	2,992.50

Subtotal	2,992.50
Shipping	0.00
Sales Tax	0.00
Total	2,992.50

Prepared by: DTURPIN



QUOTE

Page 1 of 1

Valley Business Machines

2712 S. 3600 W. Suite G West Valley City, UT 84119
Ph: (801) 969-6303 Fax: (801) 969-4013

Quote Number: 0010485
Quote Date: 04/10/14
Customer PO:
Account Number: BILLINGS WEST HIGH
Salesperson: DAN TURPIN

Bill To:
BILLINGS WEST HIGH SCHOOL
2201 ST JOHNS AVE
BILLINGS MT 59102

Ship To:
BILLINGS WEST HIGH SCHOOL
MARGARET AUKSHUN
2201 ST JOHNS AVE
BILLINGS MT 59102

Buyer Phone: (406) 261-5710
Fax:
Route/Seq: FEDEX/0

Line	Item Number	Description	UOM	Qty	List Price	Price	Total
1	TEXNSCXNAV30	30-USER NSPIRECX NAVIGATOR	EA	1	0.00	2,426.08	2,426.08

Subtotal	2,426.08
Shipping	0.00
Sales Tax	0.00
Total	2,426.08

Prepared by: DTURPIN

**Valley Business Machines**

2712 S. 3600 W, Suite G West Valley City, UT 84119
Ph: (801) 969-6303 Fax: (801) 969-4013

QUOTE

Page 1 of 1

Quote Number: 0010488
Quote Date: 04/10/14
Customer PO:
Account Number: BILLINGS WEST HIGH
Salesperson: DAN TURPIN

Bill To:
BILLINGS WEST HIGH SCHOOL
2201 ST JOHNS AVE
BILLINGS MT 59102

Ship To:
BILLINGS WEST HIGH SCHOOL
MARGARET AUKSHUN
2201 ST JOHNS AVE
BILLINGS MT 59102

Buyer Phone: (406) 281-5710
Fax:
Route/Seq: FEDEX/0

Line	Item Number	Description	UOM	Qty	List Price	Price	Total
1	TEXNSPIREXCAS	TEACHER PACK OF 10 NSPIREXCAS	EA	3	0.00	1399.73	4,199.19

Subtotal	4,199.19
Shipping	0.00
Sales Tax	0.00
Total	4,199.19

Prepared by: DTURPIN



Margaret Aukshun <aukshunm@billingschools.org>

HP

1 message

Kelly Goodman <goodmank@billingschools.org>

Thu, Apr 10, 2014 at 7:19 AM

To: Margaret Aukshun <aukshunm@billingschools.org>

PC Computers	HP Elitebook 8570p Notebook	\$819.12
	HP Compaq Pro 6300 All-in-One	\$920.02
	HP Compaq Pro 6300 Microtower Desktop	\$671.01
	- HP Compaq LA2206x 21.5-inch WLED Backlit LCD Monitor	\$190.00
	- HP Compaq LA2306x 23-inch WLED Backlit LCD Monitor	\$200.00

Revised August 20, 2001
THIS IS NOT A PURCHASE ORDER
SCHOOL DISTRICT NO. 2

Note: Right Click and Update Field to Calculate Total Price, Subtotal, and TOTAL!

Perkins
 District
 State Voc Ed
 ECA
 Angel Fund

9/4/2012

No.	QTY	UNIT	STOCK NUMBER	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	2	cart	T9A241739A	Enclosed Flat Top Shelf And Tray Lower Shelf Cart With 5 Inch Rubber Casters	\$185.00	\$370.00
2						\$ 0.00
3						\$ 0.00
4						\$ 0.00
5						\$ 0.00
6						\$ 0.00
7						\$ 0.00
8						\$ 0.00
				Subtotal		\$ 370.00
				Shipping		114.24
				TOTAL		\$484.24

[illegible]