BUILD TEACHABLE MOMENTS

TEACHER EXPECTANCIES:
Over Teach/Over Learn
Student/Teacher Relationships
Simple Examples

4 WAYS TO ASSESS BACKGROUND KNOWLEDGE

SUMMER INSTITUTE
...we learn better when faced with low or moderate stress rather than when faced with high stress or no stress at all.

This issue of “Shop TALK” is based on three of the Regional Professional Development Program’s (RPDP) “Teacher Expectancies” including: building relationships, over teaching and over learning, and solving simple examples. The “Teacher Expectancies” back-up the Components of an Effective Lesson and follow what teachers need to be doing on daily basis, no matter if a teacher is developing a new concept or simply administering a test. For example, when administering a test, teachers are less likely to develop a formal lesson plan to meet all the Components of an Effective Lesson, and they are more likely to engage in teacher expectancies.

Consider the three teacher expectancies mentioned above when administering a test. Teachers administering a test can build relationships by standing outside their door and greeting students with a smile. Those kind of relationships can be extended into the classroom by taking a few moments to review some of the upcoming information on the test. Each of these techniques indicates a willingness to build relationships and show to the students that a teacher cares about student success. With the same token, teachers can review over teach and over learn before a test by going over simple examples. Teachers should conduct a mini review session right before a test by over teaching material that will be tested that day. This review should be short, no more than five minutes, and directed by the teacher. Nothing should preclude a teacher from making kids feel completely comfortable with the material that will be tested. During this review, teachers should use simple examples that are meaningful and easy to apply. This will help give students a much needed warm-up before the test. Teachers that don’t submit to this philosophy should ask themselves if they would go out and run a race without stretching or warming-up, the same applies to students taking a test.

The teacher expectancies are not intended to replace the components of an effective lesson, but moreover, support and back-up the components. Teacher expectancies are intended to be used every day in the classroom to help teachers with the following: teaching a new concept, reviewing previously taught material, administering a test, etc.
DEPARTMENTS

4 Elementary Literacy
Information text in the elementary classroom is essential and it is necessary to explicitly teach our students how to use it.

6 Elementary Math
Deciding the right path to increase student achievement while building teachable moments.

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Improve student/teacher relationships by formalizing student knowledge of technology, capitalizing on student technology skills, and designing or redesigning lessons to integrate technology.

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Lesson Development

COMPONENTS OF AN EFFECTIVE LESSON

- INTRODUCTION
- DAILY REVIEW
- DAILY OBJECTIVE
- CONCEPT DEVELOPMENT
- CONCEPT LINKAGE IN DISCIPLINE
- CONCEPT LINKAGE OUT OF DISCIPLINE
- GUIDED PRACTICE
- GROUP PRACTICE
- INDEPENDENT PRACTICE
- LONG-TERM MEMORY REVIEW
- CLOSURE
- HOMEWORK ASSIGNMENT

TEACHER EXPECTANCIES

- OVER TEACH AND OVER LEARN
- STUDENT/TEACHER RELATIONSHIPS
- USE SIMPLE EXAMPLES
- ASSESSMENT
- STUDENT NOTE-TAKING
- VOCABULARY IS STRESSED
- READING AND WRITING
- FACTS AND PROCEDURES
- TECHNOLOGY IMPLEMENTATION
- PROBLEM SOLVING
- MEMORY AIDS
- QUESTIONING STRATEGIES
In this Information Age, the importance of being able to read and write informational texts critically and well cannot be overstated. Informational literacy is central to success, and even survival, in schooling, the workplace and the community (Duke, 2000). When we realize our role as educators in relation to preparing our students for ‘the real world’, this statement has huge implications on our instruction in elementary literacy. For some of us, it may require a shift in our approach to teaching reading and writing, and possibly even a change in our classroom environment. It is absolutely essential to not only include informational text in our instruction, but to explicitly teach our students how to use it...

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Informational texts can easily be infused into a balanced literacy program. From read-alouds/modeled writing to shared, guided, and independent reading/writing, ask yourself this strategic question: “Are my students spending at least 50 percent of each of these time blocks with informational text?” (Hoyt, 2002). If not, what can you do to ensure that your students are getting adequate exposure and necessary instruction in informational texts? The following are simple examples of how to incorporate informational text in your literacy instruction. In relation to these examples, please keep in mind the teacher expectancy of ‘over-teach and over-learn’. Each of these examples provides concentrated effort and time on your part by showing your students exactly what informational text is and how to use it in everyday life. Additionally, taking the time to know the needs of your individual students and build positive teacher/student relationships will foster a classroom environment where students thrive with informational text.

Over-teach and over-learn through simple examples

Immerse your students in informational text

Share a collection of informational texts such as newspapers, menus, recipes, travel brochures and maps, owner’s manuals, and how-to books. Allow time for free exploration with the materials (Hoyt, 2002).

Help your students make a plan for reading nonfiction text

Think aloud through each of the above-mentioned informational texts to make it clear that you start to read each with a specific purpose. Show your students that you have a reason to read the materials (Hoyt, 2002).

Teach your students how to use nonfiction text features

Using a mini-lesson format, focus on a different text feature each day until you have introduced each feature (see sidebar). Share specific examples of the feature in several nonfiction books, tell the students the purpose of the feature, and allow time for the students to find examples of the feature in other nonfiction texts during small group work (Miller, 2002).

Build a classroom library that is equally represented by fiction and nonfiction texts

Keep in mind that informational text is the preferred reading material for some children. Allow them as much choice in their book selections as those students who prefer fiction.

Consider the use of informational texts across the content areas

Informational text does not have to be used only during your reading block. Maximize your instructional time by incorporating informational texts into science, math, and social studies units. When teaching a particular concept, oftentimes the use of informational texts will enhance your students’ understanding and knowledge of that concept (Robb, 2003).

Make time for read-alouds

Informational read-alouds allow you to (a) demonstrate that reading for information is interesting and fun, (b) challenge your students’ listening abilities in terms of gaining information and not solely for entertainment, and (c) expose students to real life issues that may be outside of their current experience (Hoyt, 2002).

Written By: Shan Cannon
Elementary Literacy, RPDP

References:


Nonfiction Text Features

**ABOUT NONFICTION CONVENTION**

- **Convention**  
  - Labels
  - Photographs
  - Captions
  - Comparisons
  - Cutaways
  - Maps
  - Types of print
  - Close-ups
  - Table of contents
  - Index
  - Glossary

- **Purpose**  
  - Help the reader identify a picture or photograph and/or its parts
  - Help the reader understand exactly what something looks like
  - Help the reader better understand a picture or photograph
  - Help the reader understand the size of one thing by comparing it to the size of something familiar
  - Help the reader understand something by looking at it from the inside
  - Help the reader understand where things are in the world
  - Help the reader by signaling, “Look at me! I’m important!”
  - Help the reader see details in something small
  - Help the reader identify key topics in the book in the order they are presented
  - An alphabetic list of almost everything covered in the text, with page numbers
  - Helps the reader define words contained in the text

2002 by Debbie Miller from Reading with Meaning (p. 149), Stenhouse Publishers
Time flies when you are a teacher, would you agree? It seems like yesterday we were preparing for another school year, excited about changes we were planning on making in our teaching, programs, and schools. We already have two interim assessments and two trimesters under our belts. We are already reflecting on what we have accomplished this year, and deciding if we are on the right path to “increasing student achievement.”

So, how has your year been so far? Do you feel that you have made a good faith effort to teach the curriculum? How is your relationship with your students? Are your students motivated to learn? Are your students experiencing success? As teachers, these are the types of questions we should be asking ourselves, not only today, but everyday.

As Clark County teachers, we are all expected to increase student achievement, and we have been given guidelines on how to do so in the form of “Teacher Expectancies.” The points covered in this article can all be found within the Teacher Expectancies. The points are: over teach and over learn, student/teacher relationships, and simple examples.

Over Teach & Over Learn

So what in the world does “over teach and over learn” mean? Believe us, it takes a while for it to sink in. Simply put, if a teacher continually reviews particular concepts that are important, and does not move on until there is 100% understanding, that would be considered “over teach and over learn.” An example of this might be working on basic facts. Perhaps your students are learning the 7's in multiplication (yes, one of those harder strings of basic facts to teach.) Well, you might spend a week working with them on just the 7's: modeling, flash cards, games, activities, centers, independent, collaborative and whole group settings, oral recitation while waiting in line to come into the school in the morning. You name it; the kids are immersed in working on the 7's. At the end of the week, you let the students know they will have a quiz on the 7's so they better study at home. You give the kids a quiz. Your expectation (and the kids are aware of your expectation) is that every student will pass with 100%.

Why do this? Well, think about it. Students need to know their facts, and we mean KNOW their facts. Some students will need the repeated review to get it. All students will feel successful if they can pass a quiz with flying colors, thus building their confidence to “do” math. Does it seem redundant? Do you think you’ll get tired of repeating yourself? Probably. Will your students that “get it” complain? We know that answer. But…will they KNOW their 7’s? If you smother them in practice, how could they not?

There is a cause and effect of over teach and over learn. The effect of over teach and over learn is “building success on success.” Not a bad objective, don’t you think? If our students feel successful, they will enjoy math, they will be motivated to “do” math. Math will be their life! When you understand something well, don’t you feel proud of yourself? Don’t you want to use it more and become even more successful with it? What about when you don’t understand something? Does the word “frustration” come to mind? That’s
what it’s about.

So when should you over teach? Well, we know it can’t be everyday… or can it? What about at the beginning of the year to start off with the students feeling a sense of accomplishment? What about at the beginning of a unit? It doesn’t have to take a lot of time, nor does it mean you have to rewrite your scripted program. Over teaching fits into the Components of an Effective Lesson within the daily practice section, the concept development, linkage sections, or the long term review. Try it! You will see what we mean.

**Student Teacher Relationships**

Another point we would like to discuss is the student/teacher relationship. How do you feel about your students? How do they feel about you? How does your relationship with your students impact your teaching? How does it impact your classroom management? How does it impact your mood? If you stop to think about it, the relationship you have with your students can fulfill you as an educator, or it can SUCK THE LIFE OUT OF YOU! What does a good relationship with students look like? Imagine, a classroom in which classroom management issues deal more with the organization of class jobs and room arrangement than behavior: where there is an air of respect from both the student and the teacher, where the bar for student achievement is high and the bar for the motivation to learn is even higher, where sometimes walking into the classroom, you can’t tell which is the teacher and which is the student. To put it bluntly, the buck stops with you! Put aside family environments from which the kids come from, put aside language barriers, put aside stress of hitting all the curriculum before IDMS and standardized testing. Yes, these are factors that influence the classroom climate, duly noted; however, think back to your own elementary education. Can you name all your teachers from Kindergarten through fifth or sixth grade? Do you remember how they impacted your life? Do you, even to this day, hold some in the highest regard, and others in the lowest? That is the power of a teacher. That is why we must always strive to keep our patience. That is why we must respect our students, their parents, and our colleagues. We are all in the world of education together, and as such, must learn to work together to achieve our high goals.

### Simple Examples

As we prepare to teach a new concept, we think about the scaffolding we need to build around our students’ thinking. Teaching a new concept is similar to building a new house. We start with a foundation and work our way up. The foundation must be connected or linked to students’ prior knowledge. For example, in teaching subtracting with regrouping, we don’t just jump right into the algorithm. We link back to place value, ten-ness, and the steps of subtracting. Once we have all of those concepts in the forefront of our students’ minds, THEN we begin teaching the concept of subtraction with regrouping and start out small.

We now need to build the walls and the support beams of our house. We start with simple two digit subtraction. We choose subtraction facts with which we know students are competent. Teachers who are focusing on success for their students will do this type of review until they feel the students are ready to move to the next step. The next stage would be to lead the students into the necessity of regrouping. A very effective strategy for this is to pull in a real world example such as 22 cookies for 19 kids… how many left over? As teachers, we do want students to see that the difference is only three. Eventually for a problem such as this, we want our students to use number sense and not the algorithm. This problem is used only for an example.

Once students see the need for regrouping, we begin to teach the process. This is the culmination of our lesson or the roof of our house. Now, we can teach the regrouping algorithm. We have built a solid house upon a firm foundation so our students will have success.

Working with children can be the most rewarding or the most frustrating thing anyone will ever do. There is no doubt it is also the most challenging. As teachers, we signed on to do the very best for the children in our classrooms. The golden rule of teaching is, “What would I want my child’s teacher to do?” If we always follow that mantra, everything else just falls into place. Build success, build relationships, build teachable moments, and build learning.

Written By: Dana Martin and Cynthia Jenkins
Elementary Math, RPDP
Recently, I had my first “old” moment. For most, when talking of something 20 years ago doesn’t make them feel “old,” but for me, it did. It was the first time I can remember that something happened “20 years ago.” It was a Sunday morning. It was the 20th anniversary of NASA’s Challenger Space Shuttle’s disaster. “20 years! That makes me in 3rd grade…9 years old…the age of my students!” I thought.

So, I was mentally brought back to my third grade classroom and, being a third grade teacher, back to how the environment was in the classroom. Did the lessons have “Components of an Effective Lesson?” Did my teachers have and/or use “Teacher Expectancies” to teach me “concepts” or the “Success on Success Model?” Who knows? At least, as a student, I wouldn’t have known. One thing, though, I can guarantee is the positive relationship and balance of humor that was welcomed and used in the classroom. I had fun in school. I followed the rules, was respectful, and still had fun. Thanks to classes though RPDP, these past few years, I have learned that it is a proven strategy that the classroom with positive student/teacher relationships have more productive and efficient students.

I wonder how productive and proficient my third graders are for me. Traditionally, my lessons find students opening their math notebooks and taking their highlighters out of their desks. “Miss Grant,” one shouts out, “Shouldn’t we put the date in the corner and highlight the vocabulary words?” “That’s what we do everyday, don’t we?” shouts another student. The class laughed.

For some teachers, shouting-out, or causing an eruption of laughter, would be a reason for a student to have to “move their clip” or “deduct a point.” For me, that behavior was “proof” that most students are working productively; yet, feeling comfortable enough to have some “fun” while still working hard and being productive. It just reminds me that my students know the routine of a productive classroom.

RPDP has helped me balance my comfort zone with strategies that incorporate “Teacher Expectancies” in my classroom. These strategies and ideas are reviewed in all RPDP workshops. Every RPDP workshop, training, or seminar that I have attended, I have left with a folder full of research, handouts, materials, lesson plan ideas, and other useful techniques to increase student achievement. Being both a participant and a trainer with RPDP, I have begun to add to my tool box as a teacher. After each RPDP class, I add at least ONE must-use idea per subject area that I plan to incorporate. RPDP helps me incorporate techniques that are researched-based and most importantly, fun for students. I have attended conferences, motivational speakers, and seminars which were all beneficial.

Written By: Jessica Grant
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Improving Student/Teacher Relationships through Technology

Students/Teacher relationships can make or break the classroom atmosphere. Teachers can exhibit a fluid classroom experience by empowering students to take more active roles in their classrooms. Technology naturally lends itself to the teacher being the “guide on the side, not the sage on the stage.” While teachers can capitalize on student knowledge of technology, students need a guide to provide them with the skills needed to maximize their technology skills. Teachers using technology can improve student/teacher relationships by formalizing student knowledge of technology, capitalizing on student technology skills, and designing or redesigning lessons to integrate technology. By moving toward being the facilitator of learning, teachers can move students toward being the practitioners of knowledge.

By teaching students specific skills, teachers can expand and formalize student technology knowledge. How to prioritize, organize, recognize authentic and accurate online resources, and integrating world online communities are examples of skills students do not naturally use while working with technology. Teachers should focus on higher-order thinking skills (HOTS) and rely on the National Educational Technology Standards (NETS http://cnets.iste.org/) to guide students through responsible and effective technology usage. By combining student’s natural curiosity with teachable skills, teachers have an incredible opportunity to reach directly into a student’s world.

Students are one of the prominent users in today’s technology. Teachers need to encourage students to bring their real-world technology usage into the classroom. Students are using chat, instant messaging, podcasting, watching and filming live and recorded video, and joining world communities on a regular basis. They know how to download music, video, programs, and games. They chat, use videomail, and organize in online communities like MySpace. They also use and promote the purchase of gadgetry; like the PSP™ (PlayStation Portable), digital cameras, file sharing, and gaming. Using real-world technology will also keep teachers responsive to current and emerging technology trends. Once this student technology is welcomed into the classroom, teachers can structure the use of the technology.

Designing or redesigning lessons to integrate student technology skills and interests will achieve maximum “buy-in” from students. Staff Development days are an excellent time to share and exchange best practices with colleagues while incorporating technology. For instance, allowing multiple methods of student evaluation promotes student creativity and independence. Technology easily addresses diverse needs. Students will appreciate efforts from teachers to connect within the student’s realm and the student/teacher relationship will strengthen, and perhaps, blossom.

Teachers can assimilate both teacher and student technology knowledge to form a partnership of responsibility with students and create a feeling of ownership towards learning for the student. Tapping into student resources and providing students with meaningful real-life learning experiences will show the student that the teacher cares, is excited about new knowledge, and will ultimately improve the student/teacher relationship. Not only will incorporating student and teacher technology knowledge improve the student/teacher relationship; but, in the process, will increase student achievement. Students who are empowered, engaged, and actively participating in authentic learning experiences will increase their achievement levels.

Written By: Brandy K. Mills
Online Education, RPDP

TECHNOLOGY NEWS TALK!

RPDP Website – NEW and IMPROVED
www.rpdp.net

As the population and training needs of Southern Nevada have grown, so has our website. Look for revamped features that include:

• Advanced, multi-level drop down/pull down menus
• Easier/faster navigation to the information needed
• Contact information page with personnel photographs
• Class listings for content areas supported by RPDP
• Links to Pathlore
• Links to the Nevada High School Proficiency Exam Guides and practice tests
• Newsletters and Teacher resources
• eVersions of ShopTALK editions – both past and present

Visit the new RPDP website today! www.rpdp.net
If any of you have ever had the experience of music lessons, you most likely remember those long hours of practicing when you could have been out playing with friends. Some of you may have decided that putting in the hours was just not worth it and quit playing. Others may have persevered. If this is the case, even if you haven’t played the instrument for a while, you can probably play pieces learned from those long-ago lessons. Practicing actually paid off and you reaped the benefits of over learning.

Over teaching and over learning are two teacher expectancies that are especially important in a subject like mathematics where new concepts grow on previous knowledge. After all, just as in building a house, it is necessary for the foundation to be solid and without any cracks before setting up the framework for the rest of the house (the new concept, in our case). For the teacher, this means using prerequisite checks to determine if the students are ready for the new information. These informal assessments can be in the form of daily reviews or homework checks. If the majority of the students are having trouble with previously presented topics, it is better to reteach now rather than later. Students that practice the concepts incorrectly may end up cementing it incorrectly into their memory and having to “unlearn” and “relearn” it later. Remember that practice makes perfect only if practice is done correctly. As many a music teacher has reminded their students, “Practice until you get it RIGHT and then practice some more.”

So just how does a teacher go about over teaching? In the introduction to the lesson, the teacher should point out how the new lesson is related to concepts already learned. For instance, if system of inequalities is the new concept, the warm-up could consist of graphing two inequalities. Half of the room could do one inequality and the other half the second. The teacher would show both separately and then overlap the transparencies and ask students where they think the solutions for both inequalities would be. Then when the teaching has begun, the students will realize that they already know the majority of what they will need.

The teacher should also present the new material in small steps, checking for understanding frequently before proceeding to the next step. Students can be asked to play teacher by analyzing previous student work. The teacher should also use multi-sensory techniques to ensure that as many different learning styles as possible are addressed.

Finally in the area of over teaching, experienced teachers should be able to anticipate and point out any pitfalls and misconceptions that previous students have encountered. If the topic introduced is the Distributive Property, the teacher might put up an example and say, “I’ll bet at least half of you will make the same mistake on this one because every year half of my students make the same mistake at least once. Can anyone tell me what you think will be done wrong?”

Think back again now to those music lessons (or for you, perhaps it was a sport). Maybe you practiced and practiced, but still were not able to produce the results that matched your effort. Perhaps one of the problems could be that you did not have a connection to your instructor. Studies show that student/teacher relationships are an integral part of learning. The teacher’s main goal is to teach and the student’s to learn, but this can be facilitated by creating an atmosphere in the classroom where students feel that their opinion is valued and respected and where they feel safe to ask questions. This is not to say that you have to be their friend, but a student needs to know that the teacher sees them as a person too. Taking an interest in outside activities of students or approaching them before going to their parents on problems they are having in class could very well prevent problems later on.

Written By: Mary Macioce
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When the topic of using technology in the classroom is broached, teachers respond in various ways. Some embrace the idea of teaching with and using technology, others are indifferent and will do what they feel satisfies their obligation to teach technology. Others have a myriad of reasons why not to use technology in their classrooms. One reason that is given for not using technology is that it takes too much time out of the lesson to make sure all students understand. A best practice for alleviating this problem is to foster relationships between students by putting them in loose partnerships called the “tech buddy” system.

Just as usual cooperative learning has shown to be a boon to achievement, cooperating as “tech buddies” can benefit all parties involved in the relationship. When a teacher is teaching a lesson with a complicated graphing calculator such as a TI-83 plus or TI-89, students can become disengaged if they miss a step or a keystroke. Since there are clearly students at all levels of proficiency in the classroom, teachers would be well served to use the students at the top level of proficiency to help those who are lagging behind.

From personal experience, I have learned that one of the best ways to truly learn and remember a concept or algorithm is to practice it and teach it to others. Using the tech buddy system, teachers can help students from all parts of the learning spectrum to enhance their understanding. Students who are prone to missing small details or steps benefit from a quick helping hand, advanced students benefit from practice and teaching, and the teacher benefits by being able to continue his or her instruction rather than answering technical questions on an individual basis over and over again. Creating the tech buddy system in the classroom fosters unity among students, promotes understanding, and allows the teacher time to fulfill the goals of the lesson.

The mechanics of the tech buddy system can be implemented a variety of ways in the classroom. Teachers who select the seating chart for the students can strategically place their most technologically adept students close to clusters of students who they foresee as needing additional help to make it through a lesson. Various ratios of students can be effective, but the highest ratio of students needing assistance to tech buddies should be somewhere around 4:1 in order to ensure that all students have access to quick help when necessary.

Financials

US Treasury Bonds (CBOT) $100,000

10 Year US Treasury Bond Rate 5.00%

July 25, 2006

Source: Federal Reserve

SECONDARY MATH

Improving Efficiency Using “Tech Buddies”

W

While the teacher is teaching, students are permitted a small amount of leeway in terms of being able to communicate with nearby students. If a teacher does not feel comfortable giving up a little bit in terms of their classroom control, this system will be difficult to implement. The teacher needs to be willing to let students help each other. In order to facilitate this, teachers should have students be aware of the proper times and ways of helping their classmates. By giving up a little bit of control in the classroom, teachers can reap the benefits of having students rely upon each other for help with their calculators.

From the viewpoint of lesson construction, using a tech buddy system will help graphing calculator lessons flow more easily. If students understand that their only source of knowledge and assistance is the teacher, the lessons usually progress with two problems. The first problem is that students fall behind, claim to be lost, or receive a strange error message that leads them to erroneously proclaim “my calculator is broken!” The second problem is the consequence of the first. If students need to continually ask for help from the instructor, the lesson becomes choppy and disjointed. During these stoppages in the lesson, even on task students have an opportunity to disengage from the learning experience.

Overall, by employing a tech buddy system in the classroom, teachers can achieve many favorable results, both for themselves and for their students. Students gain the benefit of teaching others and of being able to obtain immediate help. Teachers benefit from the improved flow of the lesson and the utilization of tech buddies to solve mundane calculator problems. This best practice has greatly improved my efficiency in teaching calculator-based lessons.

Written By: Brian Gregorich
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SECONDARY MATH

HS Certificate Program Offerings

Classes below are offered M-S from 8 - 4pm; Locations are TBA

**HS MCP Intermediate TI-83/84 Plus**
Start/End Date: W, 6/14/06 and R, 6/15/06

**HS MCP Trigonometry and Analysis for HS Teachers**
Start/End Date: W, 7/13/06 – R, 7/20/06

**HS MCP Geometry Overview for HS Teachers**
Start/End Date: F, 7/21/06 – F, 7/28/06

**HS MCP Calculus Overview for HS Teachers**
Start/End Date: S, 7/29/06 – S, 8/5/06

**HS MCP Probability & Stat. Overview for HS Teachers**
Start/End Date: M, 8/7/06 – M, 8/14/06

HSMCP Probability & Stat. Overview for HS T eachers
HSMCP Advanced Algebra Overview for HS T eachers
HSMCP Calculus Overview for HS T eachers
HSMCP Intermediate TI-83/84 Plus
HSMCP Trigonometry and Analysis for HS T eachers
HSMCP Geometry Overview for HS T eachers
HSMCP Calculus Overview for HS T eachers
HSMCP Probability & Stat. Overview for HS T eachers

Shop TALK - Summer 2006
As we prepare our students for the Math Proficiency Exam, it is important that we are using appropriate materials. There are many sample tests available, as well as practice worksheets which are all provided on Interact. We may, however, wish to create our own practice problems based on the needs of our individual students. This paper will provide teachers with item-writing information based on the test specifications of the proficiency exam provided by the state.

To be sure we are providing materials that are balanced, we must first look at the breakdown of the sixty questions that are graded on the exam. There are four content strands: C1 – Numbers and Operations, C2 – Algebra and Functions, C3 – Measurement and Geometry, and C4 – Data Analysis, Probability and Statistics. Within these strands, there are three levels of questioning: A1 – Conceptual Understanding, A2 – Procedural Knowledge, and A3 – Problem Solving. When creating a sample test for students, use the following table for how many items of each strand and questioning level to include. This matrix will change this following year, so watch for an updated version of the rubric.

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**Writing a Question at the Appropriate Level:**

A problem written at the Conceptual level (A1) should be used to test a student's knowledge of a particular fact. There should be no computation involved in finding the answer. These types of problems can ask about vocabulary. They also may test whether a student can choose the correct set-up for how to solve a problem. At the Procedural Level (A2), computation is involved in solving the problem. These should only involve one step to obtain the correct answer. A Problem Solving question (A3) will involve a real-world application, and will require multiple steps to answer the question.

**Tips for Writing a Good Question:**

It is important that our students are practicing with the same types of questions they will encounter on the proficiency exam. Questions are multiple choice with four answer choices. The item will ask only one question, with one correct answer. The other answer choices, called distracters, are created based upon common student errors. All of the answer choices should be plausible answers to the question, so that the correct answer doesn’t stand out for a student who must guess. Parallel answer choices should be provided. For example, there should not be one negative answer, while the rest are positive. The answer choices should be listed in numerical order. A question will not have “none of the above” or “all of the above” as an answer choice.

The question, called the item stem, should be worded clearly, with no extraneous information. A question asked positively is best, but if a word such as “not” must be used, that word should be bolded or italicized. If a graphic is needed for a problem, it will be imbedded in the item stem. Graphics should be drawn to scale. If real world data is used, it must be up-to-date and accurate. A problem will only ask one question that is written in the form of a question. Questions should not be worded so that a student would have to work out every answer choice to find the correct answer. When writing a question, be sure it is appropriate for all students, regardless of ethnicity, gender, and socioeconomic status. Avoid subjects in a problem that may lead a student to think of personal issues, such as family members or birthday gifts. Do not make references to any religious holidays or cultural celebrations.

We can help our students feel more comfortable with the proficiency exam by using the same types of questions daily in our math classes. We can expose students to these types of questions at an early age. The formatting described above can be adapted at any level. Students will have less fear of taking the test if we practice these problems daily, and let them know that they will be the same types of questions they will see on the proficiency exam.

Written By: Cassandra Dulmage
Part-Time Instructor
Secondary Math, RPDP
The ability to read and understand text is an important skill, not only in learning specific content that the teacher may require, but reading helps in the development of independent student learners. The frustration of not being able to read the textbook or understand the instructions on a worksheet or lab usually results in a behavior management problem as the student acts out these frustrations. Other students who become disengaged from the text because of their inability to understand what is being presented will end up relying on teacher-led notes and discussions. This will especially hurt students who are trying to advance to higher level math and science classes. The material covered in these classes comes at a faster pace and the teacher expects the student to use the textbook to help them learn.

Even some high school honors students must be shown how to use the text to help them learn. Students must interact with their science textbook as they would with a dialog with their teacher. So, all teachers must be prepared to show students how to use reading to learn content.

It should also be kept in mind that textbooks are not designed to provide an in-depth coverage of a subject; therefore, teachers must be prepared to show the students other reading materials that will help them master a subject. These could include trade books, electronic textbooks, interactive websites, and cd-roms. Even some popular fiction books contain science background information. Students could also be assigned newspaper and magazine articles to use. Science content is usually found in some story being reported in the daily paper. Students can read and summarize the article and write comments on the story.

Another way to encourage reading is to have the students keep a portfolio of their work. Periodically during the school year, the teacher can require the students to reflect on what they have learned. By reviewing basic concepts that have been covered and writing a summary of what they have learned, students are not only improving reading and writing skills; they are also re-establishing connections to the basic concepts that were learned only for the test.

Interactive presentations can be another way to get students to read. The ‘stand and deliver’ type of report is usually terrifying to most students. Having one student stand in front of the class nervously trying to convey information to a bored and often off-task group of fellow students can be less than productive. Even the teacher can get bored listening to the same report for several class periods. Teachers may want to try something different, in the form of an interactive presentation. This involves the students developing some kind of poster or electronic presentation that allows someone coming to individually come up to read and respond to the display. Teachers can devise a rubric that dictates what content should be covered and how many interactive parts must be present. The students must synthesize the science content information and figure out how to present the information so that the reader reacts. On the day of the presentation, the student is not by his or her display; rather they are reacting to other students’ displays. The class period is much more animated as students read and interact with other students’ displays. Each student could also be given a score sheet to help the teacher grade each display.

If there were a section or chapter in a textbook that is especially full of content material it would be prudent to break the reading into smaller, more manageable pieces. One approach is to first have the teacher ask all of the students to quickly and quietly read the entire section to themselves, not taking notes, just reading and looking at the pictures and graphics. Then the teacher would break the class into small groups of 3-4 students, giving each group one or two questions from the chapter. The group will write the question and answer on a transparency and present to the class. In a sense, the teacher has asked this group to become the expert. As they present, the other students are writing down the information in their notes. In this way students have been shown that the teacher is not the only one who can give out content.

Another successful technique for struggling readers in science classes is to have the activity before the content (ABC). After the students have done some kind of guided inquiry or observation, they can then go back into the text to read about it. After working with their hands, some students are better able to understand the content presented in the text.

Graphic organizers are another technique that can help students break down textbook content into smaller, more understandable pieces. Venn diagrams, concept mapping (i.e. Inspiration software), or drawing pictures and diagrams can all help students make sense out of what they are reading. Dinah Zike (www.dinah.com) has some excellent techniques for creating constructivist activities for students.

Teachers can model think alouds. This is an especially effective technique for helping students understand information that is displayed in graphs. As the teacher goes over each section of the graph he/she can ask questions and help the students organize their understanding about what is being displayed.

Students can be required to record misconceptions, questions, or concept understanding as they read a text. Teachers can model this by assigning a difficult reading passage and have he/she would list questions he/she might have as he/she read it.

Students could be asked to read editorials that relate to science events. Good places to look would be magazines like National Geographic or The Science Teacher. The students would be expected to write down their questions or reactions to the editorial.

To encourage the quieter students, the teacher could have students write out thoughts on the edge of the reading assignment that is part of a worksheet. As the teacher is correcting the assignment they can get a lot of insight as to where their students are having trouble.

Other ideas to help students read more could include: writing a children’s book, read a scientist’s biography and present a historical vignette, or read a non-fiction science book and keep a reading log.

With some creativity and thought, science teachers can become reading teachers. You will be developing important life-skills in your students.

REFERENCES:
Vacca, Richard T. and Vacca, JoAnne L., 2002. Content Area Reading: Literacy and Learning Across the Curriculum, Allyn and Bacon Publishing, Boston, MA.

Written By: Jonelle Hopkins Part-Time Instructor Secondary Science, RPDP
Three elements of the Teacher Expectancies—Over Teach and Over Learn, Student/Teacher Relationships and Simple Examples—are so closely related that any discussion of one becomes a discussion of all three. According to Bill Hanlon, Director of SNRPDP, Over Teach and Over Learn refers to the “building success upon success model” by breaking complex concepts into smaller more manageable chunks of information and teaching that concept until students gain mastery. The term also refers to teaching to and about multiple learning modalities and “showing students how to study in order to meet their individual needs.” This type of instruction is dependent upon knowing our students academically, through informal and formal assessments, and individually, through modality and interest surveys. Once we are able to accurately assess our students’ academic levels and their general learning styles, we can address their individual needs. Being able to provide simple yet relevant examples when teaching a concept is only possible when we are aware of student background knowledge and can use examples that fit their existing schema. None of this can happen, however, unless we promote a strong Student/Teacher Relationship by creating a positive learning environment.

With this in mind, accurate yet quick and easy pre-assessments are essential. According to Lev Vygotsky, a Russian psychologist, learning is maximized for each student if we are able to teach within individual “Zones of Proximal Development” or ZPD (Vygotsky, 1978). This is the area between what learners can accomplish independently and what they can learn with the help of an expert. Our job is to discover what students can do independently and what they can accomplish with support. Using Bloom’s Taxonomy of questioning is an easy way to understand what Vygotsky meant by ZPD. If a student is working on a new concept at the knowledge level, we need to ask questions and design activities that take him up one notch to the comprehension level. It would be counter productive to ask a student working at the analysis level to move down to the comprehension level.

Thus, assessing students’ prior knowledge before teaching a concept becomes essential. Although there are numerous ways to assess background knowledge, following are four easy and creative suggestions:

**ABC Preview/Review:**
*Give each student* (or pair of students) an ABC chart (see example to the right).

**Students write terms or associations** related to the desired topic that begin with each letter of the alphabet. They should fill in as many boxes as possible.

**Begin study of the topic**. Revisit the chart during the unit to add to the chart.

**Use as a review** at the end of the unit.

*Janet Allen, Words, Words, Words, 1999*

Assign activities based on individual word knowledge or place students in related groups.

**From the New to the Known:**
This is an excellent strategy to use as a pre-reading activity to help build background knowledge before the student begins an assigned reading AND to assess word knowledge levels BEFORE a new concept is introduced.
Name one important thing you learned in class today.

Write one question about today’s content—something that left you puzzled.

Read this problem and tell me what you will do first.

How can you use what you learned today in ________?

Provide at least one reason why ________.

How does what you learned today connect to ________?

“This...we know that we learn better when faced with low or moderate stress rather than when faced with high stress or no stress at all.”

Once student knowledge levels have been determined, lessons must be difficult enough to move students beyond what they know, but scaffolded to insure success (remember ZPD). This balance between challenging students and frustrating students is difficult to attain, yet imperative for learning to occur. From recent brain research, we know that we learn better when faced with low or moderate stress rather than when faced with high stress or no stress at all. Moderately stressed learners are resourceful and resilient lifelong learners. Good stress triggers a rush of adrenaline that prepares learners to rise to the challenge of the occasion, evoking their most efficient alert states. On the other hand, negative stress—provoked by anxiety, learned helplessness or perceived threat—releases an excess of glucocorticoids into the system which can inhibit present and future learning.

Following are some suggestions to help promote student success:

Ensure that learners have all the resources they need to complete a task.

Experiment with the number of resources you provide. Too much time and support provokes no stress at all; too little may create too much stress.

Avoid irregular or unbeatable deadlines.

Schedule relaxation or physical movement as de-stressing strategies—a bit of humor or a quick review game relieves stress, as well.

Eliminate threats of negative consequences. State objectives in positive, attainable terms rather than negative punishments.

Encourage the appropriate expression of emotions. Discussions, journaling, pair sharing and physical action engage emotions and encourage a positive outlet.

Use flexible grouping or buddy pairs when feasible. This will allow students to work at various levels and free the teacher to monitor individual group or student progress.

Greet students at the door; learn their names and personal interests.

Use humor when possible. Cartoons, quotes, riddles and jokes help to hold student interest and create a positive atmosphere.

Suggestions taken from Brain Compatible Strategies by Eric Jensen

In short, to prepare our students to learn concepts relevant to our classes and to teach them the skills to insure life-long learning success, we must regularly assess background knowledge, provide relevant and accessible instruction based on these assessments, and promote student success by creating a positive and challenging learning environment. This can only be achieved by taking the time to “get to know our students” and using that information to design instruction that meets their needs.

Written By: Sara Lasley
Secondary Literacy, RPDP

SECONDARY LITERACY
NEWS TALK!

Secondary Literacy offers quarterly trainings throughout the year. Whole-day trainings are also available for all secondary literacy specialists/learning strategists. Trainings take place in regional classrooms throughout the district. If you are a secondary literacy specialist/learning strategist, please contact Sara Lasley (799-3835) for details.

Finally, Secondary Literacy will continue to publish Literacy Connects quarterly and support your schools’ individual literacy needs. Please contact Sara Lasley for information on our newsletter or to schedule any type of literacy or English/Language Arts training.
Have you ever had the experience of grading an essay question from a student’s lab or test and, based on the response, had to sit back and wonder if this student ever heard one word you had said? The thoughts and ideas written down in no way reflect what it is you have spent the past several days working on. I recently received a message from a teacher who was grading her final exams and was floored by such a response. The students were expected to design an experiment which required the heating of two liquids. The students needed to state a hypothesis, write some simple procedures, note potential lab safety concerns, and identify the “CONTROLS / VARIABLES” in their experiment. Students’ answers varied, with students identifying various heat sources, procedures, controls and variables in their lab. But one answer floored the teacher, “Your CONTROLS are the buttons on the heater.” Clearly this student is confusing controls in the scientific/experimental sense and the common use of the term controls as they relate to the use and function of a piece of equipment. How is it possible for a student to attend every class, participate in every lab, and read all the required text and yet still respond with an answer that just floors you?

In short, it is simple for this to occur. In fact, I am a bit surprised it does not happen more frequently. I will even go so far as to say that answers like this probably WOULD happen more frequently if teachers were only to probe/question student understanding more deeply. I am in no way impugning the efforts of teachers, but rather I am illustrating the point that students do not enter your classroom as blank slates.

Tabula Rasa, or the thought that students enter your room devoid of knowledge, waiting for you, the master scribe, to write all that they need to know on their little minds is not only false, it is downright counterproductive to the student learning. Each and every student that enters your room does so with a slate (or white board) that is FULL of information, experiences, and personal perceptions about the concept(s) you are attempting to teach. Sometimes the information that is written there is accurate, sometimes it is merely incomplete, often it is inaccurate AND incomplete. Consequently, those concepts are not written with a white board marker, but rather a Sharpie® permanent marker, the type the custodian cannot clean off the bathroom walls.

As a classroom teacher, you can do one of two things concerning the information written on the students’ slates. One, dive into the material and pretend that the slate is clean or at least that the students are willing to write “your” information on their boards, hoping the students keep the information there long enough to pass your next test. Two, you can make an attempt to read some of that writing on the walls of their mind. Once read, you can FOCUS your lessons, labs, and discussions to address some of the misconceptions held and to strengthen the student scientific understanding of the desired concepts.

Student held concepts are not easily dispelled. Often the students have

“Tabula Rasa, or the thought that students enter your room devoid of knowledge, waiting for you, the master scribe, to write all that they need to know on their little minds is not only false...”
worked long and hard gathering the information, experiencing the world around them, asking question of experts in the field, such as classmates, why certain things work the way they do. It is possible for students to hold contradicting concepts as “true”. Holding contradicting concepts may cause some degree of “stress” in adults, but does not tend to cause the students enough concern that they feel they must “fix” the contradictions (Watson, 1990). This is not to make light of their conceptual understandings, which to the student are often very solid, and explain what they see and experience in their daily lives. Concepts that may seem self evident to an adult trained in science are frequently not so evident to the students. Your students, much like all of mankind up until Sir Isaac Newton, know full well that in order to keep an object moving you MUST keep pushing on it.

Simple Examples

Probing for what the students “know” to be true can be done with simple questions. A few days before you start teaching the concept(s), use your “Science Question of the Day”, or “Ticket out the Door” and ask the students to explain the “new” concept. (e.g. Daily Science Question: Explain the difference between a “Variable” and a “Control” as they relate to science experiments.) Be judicious when choosing the probing questions. A question that is too simple, such as define Variable and Control, may not tease out the student’s true understanding. Students may “know” the definition but may not truly understand what is meant by “Control”. Conversely if the question is too rigorous, then few students will demonstrate any understanding of the concept. If this happens, it may very well serve to strengthen the teacher’s misconception that the students “don’t know anything” about the concept, so I can just dive right in and fill their slate with knowledge.

Once you have ascertained what the students know and don’t know about the concept(s), you can work on “erasing” old and writing the new; however, this will not be easy. Once written, things are not easy to erase. In fact, they probably won’t be erased at all, unless with persistence and a well guided effort you can get the students to strike a line through parts of “their” concept and write in parts of “yours”. How is this done?

Over Teach Over Learn

One of the most successful ways to get the students to accept the “new” concept being presented by the teacher is through continuous exposure to the scientifically accepted concept. Students should not only read about the concept, but whenever possible, they should experience it in a variety of ways. The phrase, “over teach and over learn” applies here. Students should be forced to deal with the concept and be required to use it to predict/explain/solve various problems. The students need to be required to apply their understanding of the concept to a variety of unique situations, in writing, in labs, through class discussions, and homework. With each experience, the students approach the concept from a slightly different point of view. If the students’ experience is limited to just one or two examples or approaches, the likelihood of them being able to apply that “knowledge” to a unique setting is slim. “Over teach, over learn” is a simple way of stating, find where students are successful and build on it. Remember, students need to experience the concept(s) in multiple ways: lecture, reading, and hands-on, to name a few.

In all cases, as concepts are being introduced or even revisited, the use of simple examples is imperative. When introducing a new concept, start with simple concrete examples that refer, to previously learned concepts. By keeping initial examples simple, it is less likely that the students will get “lost” before they have even gotten stated. Simple examples that refer to previously learned concepts will provide the students with the scaffolding necessary to make the material more relevant to your class, and to their lives.

Several days before the actual start of the unit the students are to answer the following Daily Science Question: Define in your own words the term “density,” write the formula for density and give two examples of how “density” impacts your daily life. Based on student response, we will be able to determine IF they are familiar with the definition and formula (rote memorization) and if they have some degree of “conceptual understanding” of density. With this information in hand several days before the start of the unit, modifications can be made to the unit if it turns out that the students have a solid understanding of density, or if the other extreme is true and the students are totally ignorant of not only the impact of density in daily life, but also the formula and definition. Most likely we will have students at each end of the spectrum, with most, somewhere in between.

Student/Teacher Relationships

A teacher-student relationship built on trust and mutual understanding will go far in helping the students open their minds to the “new” ideas being presented. I am not suggesting that students should accept the “new” concept just because you have told them that it is true. Students have invested extensive time and energy into developing “their” conceptual understanding and will not easily “erase” what they hold true. One step required in replacing the old with the new is to accept that what you believed to be true is in fact “wrong”. A positive Teacher-Student relationship may at least give you the chance to prove the student’s concept “wrong”. Students who perceive the teacher-student relationship as adversarial will be unwilling to accept being proven “wrong” by their adversary. Good natured humor, open and honest communication, and genuine respect from the teacher toward all students goes far in opening young minds to new ideas and removing much of the perceived threat of being proven “wrong”.

Let’s take a moment to discuss what “over teach, over learn”, “simple examples” and “teacher-student relationships” might look like if we were teaching the concept of density. Having completed our BAM planning, we know that Nevada State Science Standard P8.A.3 states, “Students know methods for separating mixtures based on the properties of the components. E/S” In reviewing your district syllabi, you note there are several objectives pertaining to density. The students will be required to calculate the density of various solids and liquids and to be able to apply the concept of density to their daily lives. In planning our Assessment Blueprint, it was decided that the students should: 1) know the formula and definition of density, 2) Be able to solve for the unknown variable when provided with any two of the three variables, 3) Be able to accurately determine the density of various regular and irregular solids in a lab setting, and 4) Relate the concept of density to their daily lives.

Suddenly on page18...
When the unit finally begins, we start by posing the classic problem solved by Archimedes. “How can you determine if the ‘crown’ is truly made of pure gold, or if it is made of a mixture of cheaper metals?” (With the price of gold being what it is, I would suggest that you find some suitable substitute for a crown, perhaps a piece of metal pipe, copper or steel would work.) Faced with this classic problem, the students will need to “know” several different pieces of information: the formula for density, the definition for density, how to determine the volume of regular and irregular solids, how to work a triple beam or electronic balance, how to read a ruler, how to properly read a graduated cylinder, how to properly use an overflow can and catch bucket, to name just some of what they need to know. How the classroom teachers present these pieces of information is up to them. We could simple lecture to the students and tell them all they need to know, or we could pose the problem, placing the equipment “out there” and say, “This is everything you will need to answer the question. Get started now.” In all likelihood, we will use something closer to the middle of these two extremes.

We decide to provide the students with several small easily accomplished labs/tasks each addressing one or two of the skills necessary to solve the problem. Based on our teaching style, we lecture to the students either before or after the lab to clarify what they are to do, or what they just did, in the lab. Checking for understanding and misconceptions as we progress through the unit will help to further identify student held misconceptions and identify parts of the concept that may need some “extra attention”.

Regardless of presentation style, providing the students with simple examples and starting with both simple lab and paper-pencil problems will build the students’ confidence. For example, once the students have mastered calculating the density of a regular solid, have them do so for an irregular solid. After the students have mastered using the overflow can and catch bucket, make sure to provide them with some irregular solids that float. Floating irregular solids add one more degree of difficulty. Providing experiences of increased complexity to those previously mastered skills will greatly reduce the amount of frustration faced by the students and the teacher. Build success on success. Don’t expect the students to be proficient with all the equipment and comfortable with the concept if they have not been provided with an opportunity to successfully experience both. How the teacher handles the inevitable frustration will impact the students’ willingness to explore AND make mistakes. If the teacher is the adversary, students will tend to be less willing to share their thoughts and ideas, work cooperatively with others, and become seriously engaged in the problem. Student frustration will tend to increase as the student begins to recognize the flaws and inadequacies of their “old” conceptual understanding. This frustration is what you want to occur. As the students become frustrated, they are then “forced” to reconcile what they have just learned with previous knowledge. All the new experiences provided by the teacher must now be worked into their understanding of the concept. This is the point when the student strikes through “one” concept and writes in the “new” concept. If all goes well, what is written will more closely resemble the scientifically accepted understanding of the concept. A positive teacher-student relationship will help the student work through their frustration and to begin to truly master concept.

A sign of true mastery of a concept is being able to apply the concept to unique situations. Remember to provide the students with those situations as you progress through the unit. If in your classroom, students’ always solve density problems after being provided with the mass and volume of an object, on the state test they may have difficulty determining the volume of the object if they are provided the density and mass. If the students are always working on paper pencil problems, using a ruler to gather their data may present a problem for them.

Although I have focused on students’ working in a lab setting, the students should be reading about the concept, hearing the teacher talk about the concept, and they must be writing about the concept. Failure to provide the students with the reading, writing, and discussion whenever possible will limit the student’s ability to master the scientifically accepted understanding of the concept. A balanced delivery of instruction is essential to change students’ misconceptions and it starts with finding out what the students know.

Written By: Jeff Bostic
Secondary Science, RPDP

The Regional Professional Development Program (RPDP) is holding its annual “Summer Institute.” Each Department at RPDP will be hosting a week-long institute for teachers at all grade levels. Hundreds of teachers will be taking advantage of this great professional development opportunity. If you have any questions regarding the institute, feel free to call the appropriate contact person listed below. Most of the registrations for each of the departments will occur via Pathlore and will begin at different times.

**Pathlore website:** [http://pathlore.ccsd.net/stc/student/psciis.](http://pathlore.ccsd.net/stc/student/psciis.)

### ELEMENTARY

**Literacy**  
Dates: Monday 6/12/06 to Friday 6/16/06  
Times: 8:30 – 11:30, 12:30 – 3:30, & 4 – 7:45  
Location: Greenspun JHS, Henderson  
Contact: Kathryn Kinnard  
Contact Number: 799-0880 x5321  
Credits: 1-3  
Registration: Pathlore  
Search Words: Summer Institute

### Secondary

**Advanced Placement**  
Dates: Monday 6/26/06 to Friday 6/30/06  
Times: 8:00 – 4:00  
Location: Del Sol HS  
Contact: David Thiel  
Contact Number: 799-3835 x255  
Credits: 2  
Registration: [www.silverstateAP.net](http://www.silverstateAP.net)  
Search Words: NA

**Math (Exeter)**  
Dates: Monday 6/19/06 to Friday 6/23/06  
Times: 8:00 – 3:30  
Location: TBA  
Contact: Carol Long  
Contact Number: 799-3835 x245  
Credits: 2  
Registration: Call Carol Long (see above)  
Search Words: Not Applicable

**Math (HS Certificate)**  
Dates: Wednesday 7/5/06 to Monday 8/14/06  
Times: 8:00 – 4:00 (see page 10 for more details)  
Location: TBD  
Contact: John Hawk  
Contact Number: 799-3835 x243  
Credits: 3 – 15 (5 classes offered at 3 credits each)  
Registration: Pathlore  
Search Words: HS Certificate

**Science (High School)**  
Dates: Monday 6/12/06 to Friday 6/23/06  
Times: TBA  
Location: TBA  
Contact: Jeff Bostic/Bret Sibley  
Contact Number: 799-3835 x233 or x242  
Credits: 2 - 3  
Registration: Pathlore  
Search Words: PASS

**Science (Middle School)**  
Dates: Monday 6/12/06 to Friday 6/16/06  
Times: TBA  
Location: TBA  
Contact: Jeff Bostic/Bret Sibley  
Contact Number: 799-3835 x233 or x242  
Credits: 2  
Registration: Pathlore  
Search Words: Summer Institute