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Certificate Program
No Child Left Behind Act
Stipends

The SNRPDP will certify that teachers who complete the Certificate Program will have the content knowledge and pedagogical skills to be successful teaching specific subjects at specific grade levels, middle school or high school.

The coursework will be comprised of the academic standards developed by the Council to Establish Academic Standards, school district curriculum documents, as well as instruction on implementing standards-based lessons.

The classes in the program directly address the standards created by the Council to Establish Academic Standards, the courses are in content and in pedagogy, address needs of special populations which include poverty, special education, and English Language Learners, and provide for on-going training.

The Governor has set aside approximately $17 million for stipends in his executive budget to address areas of shortage identified by the state. The certificate program could attach criteria for receiving those stipends.

The Certificate Program also addresses the No Child Left Behind Act by addressing Teacher Quality and guaranteeing students having access to qualified teachers.

Proposal

The RPDP will develop and offer course work through a university. Tuition, stipend, and supplies will be paid through the RPDP for individual classes. Upon successful completion of the program and a signed agreement that teachers will implement what has been taught, a program stipend of $2000 will be paid.

Research and common sense suggest the need for sustained training, Nevada statute requires training to be on-going. Therefore, to continue receiving up to a $2000 stipend in successive years, teachers would be required to sign an agreement to continue implementing the state's academic standards and standards-based lessons. In addition, teachers would be required to attend meetings or further training, allow the RPDP to scrutinize their tests and test results, allow the RPDP to observe classroom instruction and require teachers to attend post observation meetings to discuss instructional strategies and recommend changes that result in increased student achievement.

To receive the full $2000 stipend, their students would have to perform at an identified achievement level on end-of-year tests in the subject(s) being taught.

The Legislature will set aside funds to specifically evaluate the Certificate Program by an outside evaluator such as WestEd. The evaluation will be based on gains in student achievement.

Status

The SNRPDP has already developed two programs of study for middle school teachers, one in math, the other in science. To earn the Middle School Certificate Program in Mathematics, classroom teachers will be required to complete four courses in mathematics (11 credits). The courses follow the state standards for that grade cluster; Course I is a two-credit class - Number Sets and Operations, Course II is a three-credit class – Introductory Probability, Statistics, and Geometry Concepts, Course III is a three-credit class in Intermediate Algebra, and Course IV is a three- credit class in Geometry.

To earn the Middle School Certificate in Science, classroom teachers would be required to complete three courses for a total of 11 credits. Course I is in Physical Science, Course II, Life Science, and Course III is in Earth Science.

These courses have been developed by the SNRPDP and approved for university credit. The RPDP can begin offering these classes upon passage.

SAVINGS - Initial costs – the RPDP would propose paying teachers a stipend of $50 per credit while in the program. The earliest possible date classroom teachers could complete the program and earn the $2000 stipend would be by the end of the2003-04 school year.

I would also propose that classroom teachers have an alternative to the Certificate Program by earning a Masters degree in math or science. Upon completion of their degree, they be rewarded a stipend.

And finally, the SNRPDP has developed and implemented a pilot certificate program for administrators. The instructors, supplies and credit have been paid by for the SNPDP. In recognition of the importance of the school principals, the SNRPDP hired a Principal on Special Assignment (POSA) last year to train administrators on data collection and assessment, creating school improvement plans based on data, working with needs improvement schools, schools working to attain accreditation, as well as training administrators to observe the practices being advocated to teachers through the professional development programs.

Administrators do not receive a stipend, but as an incentive, the RPDP has provided their schools three substitute days to work with their teachers. Because of limited resources, we have not been able to keep up with the workload being requested. If funding could be made available for two additional POSAs to serve Clark, Esmeralda, Lincoln, and Nye counties, it would greatly enhance our ability to implement the instructional strategies being championed by the RPDPs in the classrooms to advance student achievement.

Certificate Program
Southern NV Regional Professional Development Program

According to local superintendents, there are approximately 2,637 teachers teaching in areas of shortage identified by the state of Nevada. Additionally, many of these teachers do not meet the definition as being "highly qualified" in the federal No Child Left Behind legislation. The Certificate Program will provide training that will identify teachers as being highly qualified. The $2000 stipend was identified to match the Governor's and superintendents stipend proposal.

Costs of Certificate Program:

Year ONE - 1000 teachers

Stipend ......1000 tchrs @ $2000.....................	$2,000,000
Credits........ 4 courses at $130/course.............	520,000
Instructors..... 5 regional trainers.....................	350,000
Administrative training	500,000
Substitute days... one per participant.................	80,000
Material/supplies...	250,000
Subtotal Year ONE	$3,700,000

Year TWO – 1000 new teachers, 1000 continuing

Stipend ......1000 tchrs @ $2000.....................	$2,000,000
1000 tchrs @ $2000 2nd year	$2,000,000
Credits........ 4 courses at $130/course.............	520,000
Instructors..... 5 regional trainers.....................	350,000
Administrative training	500,000
Substitute days... one per participant.................	160,000
Material/supplies...	250,000
Subtotal Year TWO	$5,780,000
Total..	$9,480,000

Overview of Professional Development

One Goal

Increase Student Achievement
by addressing
Content Knowledge and Instructional Practices

Two Standards

Common Sense **My Kid**

Two Premises

1. **Testing drives instruction.**

2. **Teachers make a difference, teachers working together make a greater difference.**

~Continually answering the question~

What are you doing to help my child learn?

Southern Nevada Regional Professional Development Program

PROFESSIONAL DEVELOPMENT DAY AGENDA

I. General meeting – discuss items that site administrators need to address

II. Teachers meet by grade level or subject.

   A. Identify the following:

      1. The next unit of study
      2. The most difficult unit of study as determined by teacher experience
      3. The unit of study causing students the most difficulty as identified by local, state, or national test data

   B. Identify what students should know, recognize, and be able to do in the selected unit (Specification Sheet).

   C. Identify how long it should take to teach the selected unit (Benchmarks).

   D. Determine how and what to assess on the selected unit to help ensure consistency (portability) and fairness between classes of the same grade level or same subject (Test Blueprint).

   E. Identify topics within that selected unit in which students traditionally experience difficulty.

   F. Share with each other successful teaching strategies to overcome those difficulties and/or deficiencies.

   G. Share content knowledge, resources, and expertise to address student success in the identified unit.

   H. Discuss way to involve special education or ELL facilitators if specific student populations are not experiencing the same success as the general population.

   I. Examine the results of the last unit test to determine strengths and weaknesses of student's understanding of subject matter.

   J. Identify what instructional practices you will change for next year to correct these deficiencies and improve student achievement.

An agenda such as this will focus professional development on teaching and learning. This agenda cannot be discussed in a one or two hour meeting, almost the entire day should be set aside for these discussions.

This agenda requires classroom teachers to discuss what they teach, how they teach it, student performance, and implementing instructional strategies that lead to increased student achievement.

Bill Hanlon *Date: 03/02/2003*

Balance

Balance in mathematics has been defined as:

Vocabulary & Notation
Concept Development & Linkage
Memorization of Important Facts & Procedures
Applications
Appropriate Use of Technology

Balance should be reflected in assessments and in the delivery of instruction.

Standard: Finding Measures of Central Tendency.

Problem Variations in Finding the Mean

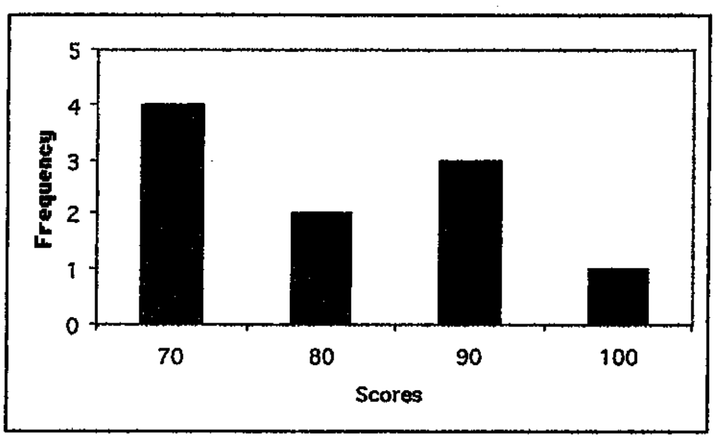
1. Find the mean of the following data: 78, 74, 81, 83, and 82.

2. In Ted's class of forty students, the average on the math exam was 80. Andrew's class of thirty students had an average of 90. What was the mean of the two classes combined?

3. Ted's bowling scores last week were 85, 89, and 101. What score would he have to make on his next game to have a mean of 105?

4. One of your students was absent on the day of the test. The class average for 24 students was 75%. After the other student took the test, the mean increased to 76%, what did the last student make on the test?

5. Use the following graph to find the mean.



Algebra,

Been there – Done that

Functions & Relations

Southern Nevada Regional Professional Development Program

Algebra, Been there –Done that is a newsletter that links algebra to previously learned concepts and skills or outside experiences

Students that have read a menu have experienced working with ordered pairs. Menus are typically written with a food item on the left side of the menu, the cost of the item on the other side as shown:

Ordered pairs

Hamburger $3.50
Pizza......................2.00
Sandwich.................4.00

Menus could have just as well been written horizontally;

Hamburger, $3.50, Pizza, 2.00, Sandwich, 4.00.

But that format (notation) is not as easy to read and could cause confusion. Someone might look at that and think a sandwich costs $2.00. To clarify that so no one gets confused, I might group the food item and its cost by putting parentheses around them :

(Hamburger, $3.50), (Pizza, 2.00), (Sandwich, 4.00)

Those groupings would be called ordered pairs, pairs because there are two items. Ordered because food is listed first, cost is second.

Relation – any set of ordered pairs

By definition, we have a relation, any set of ordered pairs.

Another example of a set of ordered pairs might be buying cold drinks. If one cold drink cost $0.50, two drinks would be $1.00, three drinks would be $1.50. I could write those as ordered pairs:

(1, .50), (2, 1.00), (3, 1.50), and so on

Function - special relation in which no two different ordered pairs have the same first element.

From this you would expect the cost to increase by $0.50 for each additional drink. What do you think might happen if one student went to the store and bought 4 drinks for $2.00 and his friend who was right behind him at the counter bought 4 drinks and only paid $1.75?

My guess is the first guy would feel cheated, that it was not right, that this was not working, or this was not *functioning*. The first guy would expect anyone buying four drinks would pay $2.00 - just like he did.

Relations and functions can be described by a relationship that generates more ordered pairs such as:

Cost = $.50 x drinks
(5, 2.50)
(6, 3.00)
(10, 5.00)

Let's look at the ordered pairs that caused this problem.

(1, .50), (2, 1.00), (3, 1.50), (4, 2.00), (4, 1.75)

The last two ordered pairs highlight the malfunction, one person buying 4 drinks for $2.00, the next person buying 4 drinks for a $1.75.

For this to be fair or functioning correctly, we would expect that anyone buying four drinks would be charged $2.00. Or more generally, we would expect every person who bought the same number of drinks to be charged the same price. When that occurs, we'd think this is functioning correctly. So let's define a function.

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A function is a special relation in which no two different ordered pairs have the same first element. Since the last set of ordered pairs have the same first elements, those ordered pairs would not be classified as a function.

Algebra,

Been there – Done that

Slope

Southern Nevada Regional Professional Development Program

Algebra, Been there –Done that is a newsletter that links algebra to previously learned concepts and skills or outside experiences

The idea of slope is used quite often in our lives, however outside of school, it goes by different names. People involved in home construction might talk about the pitch of a roof. If you were riding in your car, you might have seen a sign on the road indicating a grade of 6% up or down a hill. Both of those cases refer to what we call slope in mathematics.

Kids use slope on a regular basis without realizing it. Let's look at an example, a student buys a cold drink for $0.50, if two cold drinks were purchased, the student would have to pay $1.00.

Slope is defined as the rate of change

I could describe that mathematically by using ordered pairs; (1, $0.50), (2,$1.00), (3,$1.50), and so on. The first element in the ordered pair represents the number of cold drinks, the second number represents the cost of those drinks. Easy enough, don't you think?

$m = \frac{rise}{run}$

Now if I asked the student, how much more was charged for each additional cold drink, hopefully the student would answer $0.50. So the difference in cost from one cold drink to adding another is $0.50. The cost would change by $0.50 for each additional cold drink. The change in price for each additional cold drink is $0.50. Another way to say that is the *rate of change* is $.50. In math, we call the rate of change—slope.

In math, the rate of change is called the slope and is often described by the ratio $\frac{rise}{run}$.

$m = \frac{y_2 - y_1}{x_2 - x_1}$

The rise represents the change (difference) in the vertical values (the y's), the run represents the change in the horizontal values, the (x's). Mathematically, we write

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Let's look at any two of those ordered pairs from buying cold drinks, (1,$0.50) and (3,$1.50) and find the slope. Substituting in the formula, we have:

$$m = \frac{1.50 - 0.50}{3 - 1} \rightarrow \frac{1.00}{2}$$

Simplifying, we find the slope is $0.50. The rate of change per drink is $0.50

EXAMPLE Find the slope of the line that connects the ordered pairs (3,5) and (7, 12)

Subtract the y values place that result over the difference in the x values.

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$$\frac{12 - 5}{7 - 3} = \frac{7}{4}$$

The slope is 7/4

Algebra,

Been there – Done that

Polynomials

Multiplication by FOIL

Southern Nevada Regional Professional Development Program

Algebra, Been there –Done that is a newsletter that links algebra to previously learned concepts and skills or outside experiences

You multiply polynomials the same way you multiplied in the third and fourth grades.

All too often students do not realize a rule or procedure they are learning is nothing more than a shortcut. For that reason, math is like magic for many students. If we take the time to develop the patterns, students would not be so easily befuddled.

Polynomials are multiplied the very same way students learned to multiply in third and fourth grades. Unfortunately, they don't realize it. They hear this shortcut called FOIL, and they become FOILed.

FOIL

First
Outer
Inner
Last

In grade school, students are taught to line up the numbers vertically. In algebra, students typically multiply horizontally. Let's look at multiplying two 2-digit numbers and compare that to multiplying two binomials

$$\begin{array}{r} 32 \\ \underline{21} \\ 32 \\ \underline{64} \\ 672 \end{array} \longrightarrow \begin{array}{r} x+3 \\ \underline{x+1} \\ x+3 \\ \underline{x^2+3x} \\ x^2+4x+3 \end{array}$$

FOIL comes from a pattern that allows you to multiply binomials in your head.

Notice the same procedure is used.

If students were to look at a number of examples, they may be able to see a pattern develop that would allow them to multiply binomials in their head.

$$(x+3)(x+1) = x^2+4x+3$$
$$(x+5)(x+2) = x^2+7x+10$$
$$(x+4)(x+5) = x^2+9x+20$$

FOIL can also be used to multiply numbers in our head

$$\begin{array}{c} 21 \\ \underline{32} \\ 6-7 \end{array}$$

To find the middle term you multiply the inners and outers by crisscrossing; 3x1 and 2x2 and adding.

672

Look at the numbers in the problems, look at the numbers in the answers. Do you see a pattern? That recognition would lead us to the shortcut called FOIL, First, Outer, Inner, Last.

What do you think $(x+3)(x+2)$ would be equal? If you said x^2+5x+6, then you saw the pattern.

That same pattern would allow us to multiply numbers in our head. Imagine FOIL being used in computation.

21 x 32 = (20+1)(30+2) → 600 + (40 + 30) + 2

52 x 41 = (50+2)(40+1) → 2000 + (50 + 80) + 2

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Learning the arithmetic facts in the first four grades can be pretty hard work. Learning these facts through only rote memorization will make it more difficult than it needs to be. Teaching students strategies to help them memorize the arithmetic facts will make life easier on the kids, their parents, and especially on you.

Before any memorization takes place, the concept for each operation should be explained so the students are comfortable in their understanding.

Addition

Thinking Strategies for Learning the Addition Facts

There are 100 basic arithmetic facts, zero through nine. That's a bunch. But if we use more effective strategies to help students learn, then memorizing these facts will become easier for the students.

1. **Adding zero:** Students can quickly grasp the rule for adding zero; the sum is always the other number. 8 + 0 = 8, 0 + 4 = 4

2. **Counting on by 1 or 2:** Students can find sums like 5 + 1 or 6 + 2 by simply counting on. This thinking strategy allows students to check off 18 of the addition facts. That leaves 63 facts to be learned.

3. **Combinations to 5:** Students can learn combinations to 5, such as 3 + 2 or 4 + 1

4. **Combinations to 10:** Students can learn combinations to 10, such as 6 + 4 or 8 + 2. More facts can be crossed off the list of 100 and we are down to 56 facts to learn.

5. **Doubles:** For whatever reason, students seem to be able to remember the sums of doubles. That might be a consequence of skip counting in earlier grades. The consequence of knowing doubles is another 6 facts can be checked off our list. That leaves 50 facts to learn, we're halfway home.

6. **Nines:** It should be pointed out to students that when adding nine, the ones digit in the sum is always one less than the number added to 9. For example 7 + 9 = 16, the 6 is one less than 7. Another example, 5 + 9 = 14. 45 facts to go.

7. **Doubles plus one:** This strategy overlaps the other strategies of doubles and counting on by one. While more sophisticated, students should be taught to use this strategy when the addends are consecutive numbers. For instance, 7 + 8 becomes 7 + 7 + 1. Another example, 8 + 9 becomes 8 + 8 + 1.That's seven more off the list.

8. **Sharing doubles:** This method works when the addends differ by two. When this occurs it is possible to subtract 1 from one addend and add one to the other addend. This results in a doubles fact that has already been memorized, 7 + 5 becomes 6 + 6. Another example, 6 + 8 becomes 7 + 7. Some people call the **Sharing Doubles** strategy **Doubles plus two and** attack the problem differently. Using the Doubles plus 2 strategy, 6 + 8 becomes 6 + 6 + 2. 7 + 5 becomes 5 + 5 + 2. We now have 31 facts left to learn.

9. **Commutativity:** By changing the order, 3 + 4 to 4 + 3, it should be pointed out that's an additional 21 facts the students now know. That leaves 10 facts to learn. But it's really five because the commutative property can be used on those 10.

There are other strategies to learning the addition facts. Some teachers might use "Combinations to 5" as a strategy. Rather than using Sharing doubles, some teachers might use "Doubles plus 2". That doesn't matter. What does matter is you make sure students understand the meaning of addition and you develop strategies to help them memorize the facts.

It is expected that students respond automatically when asked a basic addition fact.

Multiplication

Thinking Strategies for Learning the Multiplication Facts

1. **Commutativity:** As with learning the addition facts, order can be changed when learning the multiplication facts. Hence, rather than learning 100 facts, we really only have to learn 55 facts.

2. **Multiplication by zero:** Students can easily grasp that 0 times any number is zero.

3. **Multiplication by one:** Again, the generalization is easy for students to see that 1 times any number is the number.

4. **Multiplication by two:** Students should be taught that multiplying by two is the Doubling strategy used in addition. Using the first four strategies, we have learned 27 more facts; only 28 remain to be learned.

5. **Multiplication by five:** Students can often be taught the fives by referring to the minute hand on a clock.

6. **Squaring:** As with the addition facts, students seem to learn square numbers faster than other facts.

7. **Multiplication by nine:** Patterns emerge when multiplying by 9. One pattern is the sum of the digits in the product is always equal to 9. The other pattern is the ten's