

# **Renaissance Partnership For Improving Teacher Quality**

## **Annotated Teacher Work Sample**

### **EIGHTH GRADE ALGEBRA: EQUATIONS AND COORDINATE PLANES (DECEMBER 2003)**

**NOTE: This TWS was created by a student teacher  
using guidelines that vary slightly from  
the Renaissance Partnership TWS**

## **DESCRIPTION AND ANALYSIS OF THE LEARNING – TEACHING CONTEXT**

### **School Characteristics**

My teaching will be done in eighth grade pre-algebra during the first period of the school day beginning at 8:50 a.m. The early hour will impact the learning environment positively because the students will be well rested. The lessons will have to include a strong anticipatory set in order to get students in the learning mode.

XXX teaches on a semester schedule, with fifty-two minute class periods and four minutes between class bells. The pre-algebra text we are using was chosen by District XX and is used in all of the district middle schools. The school completes ISAT tests each year to measure student proficiency; in addition, the school has a goal to increase ISAT scores 6% this year. Over ninety-five percent of the students enrolled at XXX have been tested using the statewide ISAT tests.

Students are placed in all math classes based on their scoring from the spring of 2003. This has a significant impact on teaching and learning in the classroom as it eliminates wide disparity in ability and knowledge making it easier to identify the starting point for lessons with this relatively homogeneous group. Two and one half special education teachers and five assistants are on staff in this school and very involved with planning for special needs students.

### **Classroom Characteristics**

My classroom is very crowded with enough desks to accommodate the largest class of thirty-eight students. There is little space in the front or back of the room. The overhead projector sits on a stand in place of the front desk in the middle isle. The impact of this arrangement is that it reduces access to students in the three middle isles. The congestion of this classroom impacts teaching and learning as it also makes varied types of instruction and cooperative learning activities very difficult. No social dynamics or groupings have been identified given the arrangement and assigned seating. Use of technology is also impacted in this classroom, as all computer-generated

aids must be shown on a twenty-one inch screen T.V. located at the rear corner of the room, or using the portable projector on the screen at the front of the room. It is not certain that the classroom can be rearranged to allow all students to gain view of the T.V. screen.

### **Student Characteristics**

Students come from a wide range of socioeconomic environments but generally range from middle to upper middle class. This could impact teaching and learning based on varied support students will gain from home. Many students will come from two working parent families, and may have limited assistance with homework. The importance of education will vary between households based on family structure and situation.

**Family factors mentioned, but no mention of implications.**

My class size is thirty students of which twenty-nine are thirteen years old approaching their birthday. The class consists of 16 boys and 14 girls, with 25 Caucasian, 3 Hispanic, 1 Native American, and 1 student of Middle Eastern descent. All thirty students speak and understand English well and use it as a first language. Since most eighth grade students are typically taking algebra, this class represents a somewhat underachieving group. These factors will impact the teaching and learning in the classroom, requiring a higher level of support, and a carefully managed lesson pace to insure that students stay up with the group.

Some mention of instructional implications

No special needs students can be easily identified, and none have been identified by the school. However, differences in learning needs and interacting skills will become apparent as the semester proceeds.

Even though there may not be classical special needs students, it will be important as the teacher to identify weaknesses, and insure that all class members are involved and can succeed.

**-This conflicts with prior information about school Special Ed. Staff.  
-Needs to mention other student characteristics (styles, culture, interests, etc.)  
-No mention of students who need more challenge or are below grade-level, even tho' they are discussed later**

## LEARNING GOALS

The instructional sequence has been chosen to fall in sequence with the lessons taught by the cooperating teacher and the other student intern and is required curriculum under the Idaho Achievement Standards. All five target goals listed below contain core subject matter tested in the “Direct Mathematics Assessment” for eighth grade students.

**Target (Goal) 1:** ( Knowledge-level)

Note that the level of learning is specified.

*The students will know and understand the principles of integer multiplication.*

Target (goal) 1 is a natural progression of increasing knowledge based on addition and subtraction of integers, and especially negative integers. The starting point for this instruction will be the use of the integer line, and comparison of multiplication results with the knowledge gained from addition of integers related to the integer line. Problems will include real-life application to aid the student in understanding the value of the knowledge being built. Target (goal) 1 is aligned with district twenty-five standards and Idaho Achievement Standards **337.02.a** comprehension of principles of integer multiplication, and **339.01.d** application to solve problems.

The alignment with standards is made clear.

**Target (Goal) 2:** Knowledge-level

*The students will know and understand the principles of integer division.*

Target (goal) 2 is a natural progression of increasing knowledge and complexity of knowledge to solve increasingly more difficult mathematical expressions. Special emphasis will be made on handling negatives during multiplication and division especially handling parenthesis and brackets. Problems will include real-life application to aid the student in understanding the value of the knowledge being built. Target (goal) 2 is aligned with district twenty-five standards and Idaho Achievement Standards **337.02.a** comprehension of principles of integer division, and **339.01.d** application to solve problems.

**Target (goal) 3: Reasoning-level**

***Students will learn to develop mathematical equations and solve story problems using integer operations.***

Target (goal) 3 is a natural progression of demonstrating the ability to use the knowledge of integer multiplication and division to solve story problems. This target (goal) moves from the Bloom knowledge/comprehension levels of targets (goals) one and two to the higher level of application in target (goal) three. Problems will include real-life application to aid the student in understanding the value of the knowledge being built. Target (goal) 3 is aligned with district twenty-five standards and Idaho Achievement Standards **339.01.d** application to solve problems, and will involve practice relative to standard **337.02.a** comprehension of principles of integer division.

**Target (goal) 4: Knowledge-level**

***The students will understand how to find ordered pairs, and plot points on a coordinate plane.***

Target (goal) 4 breaks from problem solving with a single finite solution to a set of solutions. It follows mastery of problem solving with integers, and becomes the introduction into linear algebra. Students will understand the four quadrants of the coordinate plane, and be able to locate points on this plane, as well as calculate areas and perimeters of solids created in the coordinate plane. Target (goal) 4 is aligned with district twenty-five standards and Idaho Achievement Standards **343.02.a**, and **340.03.b** coordinate geometry. This knowledge will be tested in direct mathematics assessment for eighth grade students.

Goals reflect several types of learning (using the Stiggins model).

**Target (goal) 5:** Product-level

*The students will construct graphs of simple linear equations, and figures on the coordinate plane.*

Target (goal) 5 will solidify the student understanding of simple linear equations and provide a lead-in to linear algebra. Several fun problems will be supplied the students for practice, with the product being handed in for a grade. Target (goal) 5 is aligned with district twenty-five standards and Idaho Achievement Standards **343.02.a**, and **340.03.b** coordinate geometry.

## ASSESSMENT PLAN

My assessment plan uses a variety of assessments including paper-and-pencil tests, informal questioning, worksheets, observations, class discussions, and dispositions. A pre-assessment will be given a couple of weeks before the beginning of my six lessons to test the student's knowledge on each of the five achievement target (goal)s (goals). A post-assessment will take place at the end of the six lessons similar to the pre-assessment to measure the degree that each student has achieved the target (goal)s (goals). The achievement goal for each target (goal) is for 80% of the students to test at 70% correct or better. The table below summarizes the achievement target (goal)s (goals), assessment methods, rationales for selection of the assessment methods, and adaptations for students with special needs.

**NOTE: The Renaissance TWS guidelines require that the Rationale be placed in paragraphs, rather than in a table.**

<i>Targets (goals)</i>	<i>Assessments</i>	<i>Rationale</i>	<i>Adaptations</i>
1. The students will know and understand the principles of integer multiplication. <i>(Knowledge)</i>	<ul style="list-style-type: none"> <li>▪ <u>Pre-Assessment</u> Sample exam set</li>   <li>▪ <u>Interim Assessment</u> Personal communication Class Discussion Selected response Problem set 3.5 <i>Integer multiplication</i></li>   <li>▪ <u>Post-Assessment</u> Selected Response Short answer End of chapter exam.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Selected response, short answer</i> has been chosen as the pre-assessment type. This method is typically used to test math comprehension as problem completion showing all work provides information on understanding of math properties and accurate processing.</li>   <li>▪ Interim Assessment consists of ongoing steps to insure that students are gaining knowledge. These are:  <i>Informal questioning</i> allows for understanding and clarity.  <i>Class discussion</i> allows the teacher to clarify and provide new information to the students.            The <i>problem set</i> as homework will allow the students independent practice manipulating integers (focus on negative integers). Reviewing homework daily provides valuable feedback on missed concepts.</li>   <li><i>Selected response</i> showing work is an excellent method of quickly identifying if the student can successfully complete a math problem. By showing work, I will be able to identify processing problems or lack of understanding with properties of negative numbers.</li> </ul>	<p>No students identified needing support on the pre-assessment.</p> <p>After careful consideration no student has been identified as needing adaptations for homework. Two students who may be behind grade level will be target (goal)ed for verbal response during informal questioning when success is assured.</p> <p>Every student will be given adequate <i>time</i> to complete the post assessment. Concern is over the four students that appear to be below grade level in math knowledge.</p>

The Ren. TWS uses “Formative” instead of “Interim”



<i><b>Achievement Target (goals)</b></i>	<i><b>Assessments</b></i>	<i><b>Rationale</b></i>	<i><b>Adaptations</b></i>
2. The students will know and understand the principles of integer division. ( <i>Knowledge</i> )	<ul style="list-style-type: none"> <li>▪ <u>Pre-Assessment</u> Sample exam set</li> <li>▪ <u>Interim Assessment</u> Personal communication Informal Questioning Class Discussion Selected response Problem set 3.6 <i>Integer division</i></li> <li>▪ <u>Post-Assessment</u> End of chapter exam.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pre-assessment (see above).</li> <li>▪ Interim Assessment <i>Informal questioning</i> allows for understanding and clarity. <i>Class discussion</i> allows the teacher to clarify and provide new information to the students. <i>Independent practice</i> in the form of a problem set will provide practice in integer division.</li> <li>▪ Post- assessment (see above). The same end of chapter exam will be used to post-assess all five target (goal)s (goals).</li> </ul>	<p>No students identified needing support on the pre-assessment.</p> <p>(see above)</p> <p>Additional time will be provided for below-grade-level students as needed.</p>
3. Students will learn to develop mathematical equations and solve story problems using integer operations. ( <i>Reasoning</i> )	<ul style="list-style-type: none"> <li>▪ <u>Pre-Assessment</u> Sample exam set</li> <li>▪ <u>Interim Assessment</u> Personal communication Informal Questioning Class Discussion Group activity (Turning word problems into equations.) Selected response Problems set 3.7</li> <li>▪ <u>Post-Assessment</u> Selective Response End of chapter exam.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pre-assessment (see above)</li> <li>▪ Interim Assessment <i>Informal questioning</i> allows the teacher to clarify and provide new information to the students. <i>Group activity</i> provides the opportunity for students to do some cooperative learning. Groups will be given word problems to solve and explain to the class. Student disposition can be identified through this practice. <i>Independent Practice</i> in the form of a problem set will provide students practice calculations using integers and turning word problems into algebraic equations.</li> <li>▪ Post- assessment (see above). The same end of chapter exam will be used to post-assess all five target (goal)s (goals).</li> </ul>	<p>No students identified needing support on the pre-assessment</p> <p>I will give the students who wish a copy of the slide with steps to solve word problems. This will assist below-grade-level students with making good notes in their journal.</p> <p>No adaptations needed for the group activity. A substitute set of problems with higher-level Bloom targets (goals) will be given to students who come into the subject with advanced knowledge.</p> <p>Added time is provided for below-grade-level students as needed.</p>

Adaptations made for students' prior knowledge, **but not for other needs (e.g., home support, learning style)**

<p>4. The students will understand how to find ordered pairs, and plot points on a coordinate plane.</p> <p>(Knowledge)</p>	<ul style="list-style-type: none"> <li>▪ <u>Pre-Assessment</u></li> <li>▪ <u>Interim Assessment</u></li> </ul> <p>Personal communication  Informal Questioning  Class Discussion  Selected response  Problem set 3.8  <i>Coordinate plane</i></p> <ul style="list-style-type: none"> <li>▪ <u>Post-Assessment</u></li> </ul> <p>Selective Response  End of chapter exam.</p>	<ul style="list-style-type: none"> <li>▪ Pre-assessment (see above).</li> </ul> <p><i>Informal questioning</i> allows for understanding and clarity. <i>Class discussion</i> allows the teacher to clarify and provide new information to the students. <i>Independent practice</i> in the form of a problem set will provide practice in graphing coordinate pairs integer division. Practice test will provide time to evaluate weaknesses and address them before the post assessment.</p> <ul style="list-style-type: none"> <li>▪ Post- assessment (see above).  The same end of chapter exam will be used to post-assess all five target (goal)s (goals).</li> </ul>	<p>No students identified needing support on the pre-assessment</p> <p>No substitute set of problems will be provided, as all students should focus on the subject material on the chapter test. Over half of the class historically scores poorly; by reviewing the practice test it is hoped that students identify focus areas to study.</p> <p>Added time will be provided as needed on the post-assessment to insure all students can demonstrate competence.</p>
<p>5. The students will construct graphs of simple linear equations and figures on the coordinate plane.</p> <p>(Product)</p>	<ul style="list-style-type: none"> <li>▪ <u>Pre-Assessment</u></li> <li>▪ <u>Interim Assessment</u></li> <li>▪ <u>Post-Assessment</u></li> </ul> <p>Sample exam set</p> <p>Personal communication  Informal Questioning  Class Discussion  Create graphs and make a figure built on coordinates to challenge friends.  <i>Coordinate Plane</i></p> <p>End of chapter exam.</p>	<ul style="list-style-type: none"> <li>▪ Pre-assessment (see above).</li> </ul> <p><i>Informal questioning</i> allows for understanding and clarity. <i>Class discussion</i> allows the teacher to clarify and provide new information to the students. <i>Create Graphs Two parts:</i> First Students will be given some linear equations and figures to plot on coordinate paper supplied. Second they will be asked to Create a figure based on directions and coordinates to challenge their friends. <i>(Rubric Supplied)</i></p> <ul style="list-style-type: none"> <li>▪ Post- assessment (see above).  The same end of chapter exam will be used to post-assess all five target (goal)s (goals).</li> </ul>	<p>No students identified needing support on the pre-assessment</p> <p>No adaptations needed, as there will be ample time for all students to complete the product in class or as a small home assignment.</p> <p>Study night for students to prepare for the exam.</p> <p>Added time will be provided as needed on the post-assessment to insure all students can demonstrate competence.</p>

## Pre-Assessment Units 3.5-3.8 (KEY)

### Target (goal) 1 Integer Multiplication:

Solve the following.

1.  $-3 (-5) = 15$

2.  $(-6)(-3)(-2) = -36$

3.  $F^{\circ} = 9/5 (C^{\circ}) + 32$  find  $F^{\circ}$  when  $C^{\circ} = -20$  degrees **-4  $F^{\circ}$**

Indicates which questions on the test match which learning targets (goals).

### Target (goal) 2 Integer Division:

Solve the following.

4.  $\frac{(-3)(6)}{-2} = 9$

5.  $\frac{(-3)(-8)}{-2} = -12$

6. Joe started a new business. The profit or loss for his first four months was  $-\$35$ ,  $-\$60$ ,  $\$85$ , and  $-\$30$ . What is Joe's average monthly profit or loss for the first four months.  **$-\$10$**

### Target (goal) 3 Problem Solving using integers

Solve the following:

7.  $2p + 6 = -18$   **$X = -12$**

8.  $-276 = 23P - 23$   **$P = -11$**

9.  $\frac{P}{-8} = 6$   **$P = -48$**

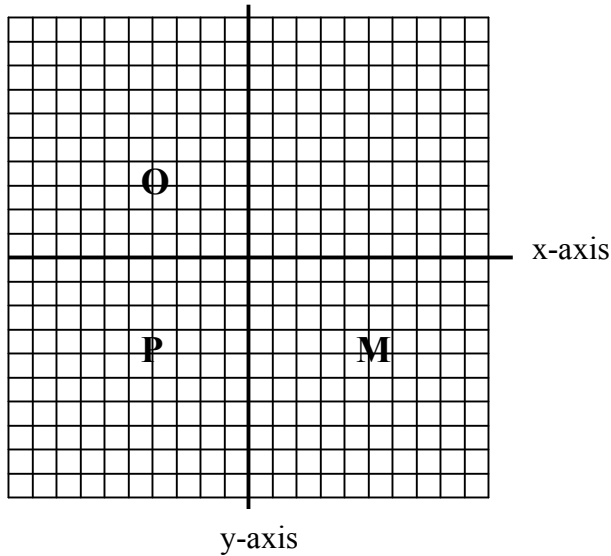
10.  $5 - \frac{32}{Q} = 13$   **$Q = -4$**

### Target (goal) 4 Coordinate Plane

11. Using the coordinate plane below. List the **letter of the point** described by the ordered pair give, and list in **which quadrant** the point is located.

Point Shown	Letter number	Quadrant
( 4, -3)	<b>M</b>	<b>4<sup>th</sup></b>
(-3, 3)	<b>O</b>	<b>2<sup>nd</sup></b>
(-3, -3)	<b>P</b>	<b>3<sup>rd</sup></b>

Graph for problems 12 and 13

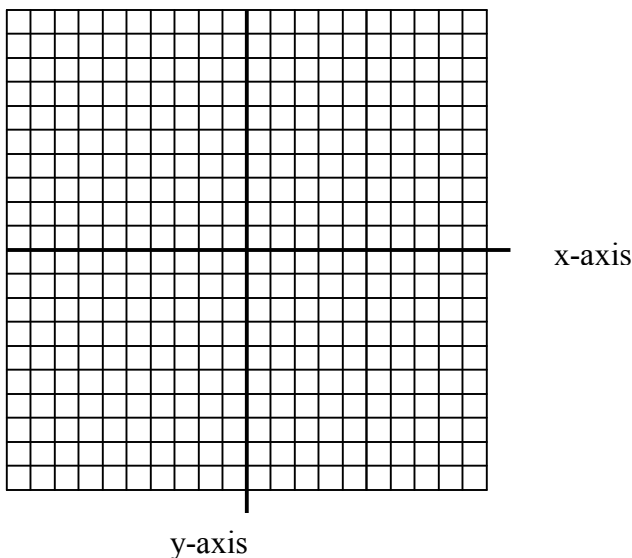


**Target (goal) 5 Coordinate Plane**

12. The three points above are located at the vertices of a rectangle. **Locate the coordinates of the fourth vertices and give coordinates.** (4, 3)

13. What is the **area** of the rectangle from problem 10? **42 square units**

14. Plot the linear equation  $Y = 2X - 3$  and  $Y = \frac{-1}{2}X + 1$   
Graph for problem 11



15. What do you notice about these two lines **circle all that are correct.**
- a. One line is much steeper than the other.
  - b. The lines are parallel (never cross)
  - c. The lines perpendicular (intersect)
  - d. The lines are the same slope (steepness)

## Post-Assessment Units 3.5-3.8 (KEY)

### Target (goal) 1 Integer Multiplication:

Solve the following. (3 pts each)

1.  $(-6)(-5) = 30$

2.  $(-5)(-3)(-4) = -60$

3.  $(8)(-4) = -32$

4.  $F^{\circ} = 9/5 (C^{\circ}) + 32$  find  $F^{\circ}$  when  $C^{\circ} = -15$  degrees **5 F<sup>o</sup>**

### Target (goal) 2 Integer Division:

Solve the following. (3 pts. each)

5.  $\frac{(-3)(6)}{-2} = 9$

6.  $\frac{(-3)(-8)}{-2} = -12$

7. Joe started a new business. The profit or loss for his first four months was  $-\$35$ ,  $-\$60$ ,  $\$85$ , and  $-\$30$ . What is Joe's **average** monthly profit or loss for the first four months.  **$-\$10$**

### Target (goal) 3 Problem Solving using integers

Solve the following: (4 pts. each)

8.  $p - 6 = -18$   **$p = -12$**

9.  $P + 16 = 23$   **$P = 7$**

10.  $\frac{p}{-4} = 6$   **$p = -24$**

11.  $-3Q = 60$   **$Q = -20$**

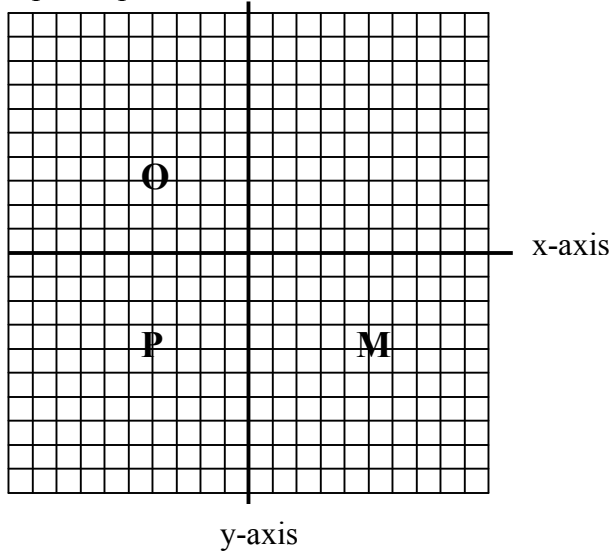
12. The product of  $b$  and  $-3$  is  $33$ . Write the equation and solve for  $b$ .  **$-3a = 33$  ;  $a = -11$**

### Target (goal) 4 Coordinate Plane

13. Using the coordinate plane below. List the **letter of the point** described by the ordered pair give, and list in **which quadrant** the point is located. (1 pts each)

Point Shown	Letter number	Quadrant
(4, -3)	<b>M</b>	<b>4<sup>th</sup></b>
(-3, 3)	<b>O</b>	<b>2<sup>nd</sup></b>
(-3, -3)	<b>P</b>	<b>3<sup>rd</sup></b>

Graph for problems 14 and 15



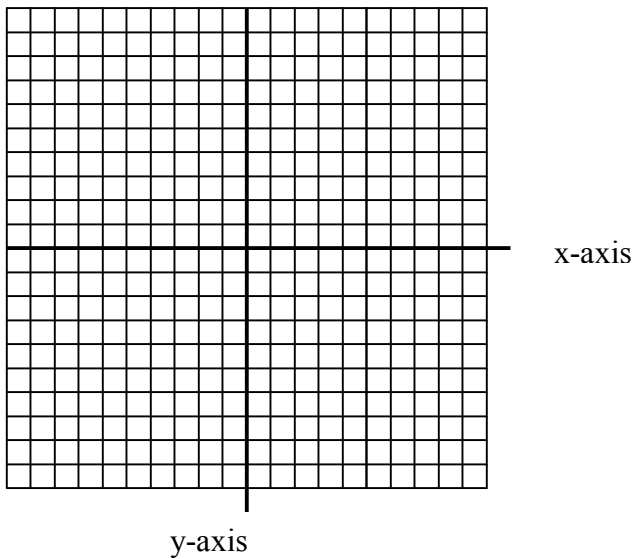
**Target (goal) 5 Coordinate Plane (2 pts each)**

14. The three points above are located at the vertices of a rectangle. **Locate the coordinates of the fourth vertices and give coordinates.** (4, 3)

15. What is the **area** of the rectangle from problem 10? **42 square units**

EXTRA CREDIT (3 pts)

Plot the linear equation  $Y = 2X - 3$   
Graph for problem 11



Adaptation for students who need more challenge.

## DESIGN FOR INSTRUCTION

### Results of Pre-Assessments

The class I am teaching is relatively quiet compared to most other classes, and tends to perform poorly on tests. The last exam results had over sixty percent of the class failing the exam, with the C.T. re-teaching several important principles. As the teacher I cannot rely on students to ask questions of clarification in this class. It is also necessary to continually stress and model the principles of distributive property, and order or operation by including them in examples as the new material is taught, as these important principles are not well understood by a third of the class.

Uses info. from prior unit as valuable pre-assessment information and discusses implications.

A pre-assessment was given using a selected response, short answer, quiz with twenty different responses addressing each of the five target (goals). [See chart in “Analysis of Student Learning” Section.] Responses in all areas demonstrate a near total lack of knowledge in these areas, with target (goal) #1 being at the high of 24% correct response, and target goals #4 and #5 being the lowest at 4%, and 0% respectively. The first question on the pre-test created some confusion, as the numbers being multiplied were not in parentheses. The second problem with three integers, all in parentheses, showed the highest correct percentage of 50%. Beyond the first target (goal), there were scattered students who could successfully solve the problems, but none performed well in more than one of the five target (goal) areas. This indicates that the entire class will start from a very rudimentary level of knowledge.

### Learning Activities

**(NOTE: The Renaissance TWS requires an outline or block plan to show each day of the unit; this student teacher was required to discuss the plans instead of including a visual organizer.)**

To this point the students have dealt with solving either mental equations or single step equations with all positive integers. The purpose of the units we are teaching is to give the students all of the tools they need to process any equation single step solution of an equation, including problems involving negative integers. In addition, the coordinate plane will help students conceptualize single solutions compared to sets of solutions (linear equations) and solutions sets between two linear equations. The C.T. will then proceed to teach algebra application with multiple step solutions and focus on real life problem-solving.

The C.T. teaches well over 90% of her lessons as teacher-led whole class instruction. Based on the testing results year to date, most of the students are not demonstrating an acceptable level of competence. In an attempt to gain more interest and involvement from this group of quiet students, I plan to use a variety of instructional strategies. I will begin my lessons using directed whole-group instruction, which mirrors the method used nearly every day in this classroom. Starting with the third lesson, the students should be comfortable with the new teacher and I will employ technology and a variety of instructional strategies. My hope is that I can learn what strategies work best with different target objectives. I will use a variety of teaching strategies including teacher-directed, TABA, and small groups to gain better involvement from the students, while providing variety and a few fun learning activities. The second day of this unit, (target # 3 -- LAP #4) will focus on tying the equation problem-solving to other disciplines using equations being taught or used in physical science.

Initially I did not think that target #4 would take an entire period to teach, but based on the pre-assessment results (4% correct); I will have to make sure that I carefully cover this material. The assignment from this lesson will be to create a figure in the coordinate plane and write directions for another student to complete in class as part of the assignment for day six. This assignment will be

sent home with a second outreach letter to the students. I have also decided to assign the chapter practice test on day five, giving us an opportunity to correct this in class and identify any class confusion before the post-assessment.

My goal of having 80% of the class perform above the 70% level on the post-assessment is aggressive based on past class performance. It will be important that I recognize and address deficiency in learning quickly. Depending on the timing of my lessons, I plan to have a day for review before the post-assessment. Timing seems to be a potential issue as several shortened days will cut into instruction time during this instructional sequence.

**NOTE: The Renaissance TWS requires a discussion of 3 unit activities; this student teacher was required to include all 6 lesson plans with reflections on their success.**

The 6 lessons below are explicitly aligned with the learning targets (goals), and all goals are covered in the design.

# LEARNING ACTIVITY PLAN # 1

**Name:** xxxxxxxx  
**Content Area:** Pre-Algebra

**Estimated Time:** 52 minutes  
**Grade Level(s):** 8<sup>th</sup>

**Achievement Target (goal)s (goals):**

**Assessments:**

<ul style="list-style-type: none"> <li>• Target (goal) #1 The students will know and understand the principles of integer multiplication. (<i>Knowledge</i>)             <ul style="list-style-type: none"> <li>○ I.A.S 337.02.a ; 339.01.d</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Pre-Assessment – selected response. <i>Correct response rate 24%.</i></li> <li>• Interim-Assessment.             <ul style="list-style-type: none"> <li>○ Independent practice problems.</li> <li>○ Personal communication; Class response to questions.</li> </ul> </li> <li>• Post-Assessment- Selected Response.</li> </ul>
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**Instructional Strategies:** Direct whole-group  
**Special Planning and Preparation:** N/A

**Procedures/Timeline:**

Procedures	Time	Materials	Adaptations for Students with Special Needs
<b>Pre-test</b>	0 min	Completed two weeks prior to lesson to determine level of knowledge.	None, needed as students could either work the problem or put a “?” if they had no idea how to do that problem.
<b>Anticipatory Set:</b> Pledge of Allegiance. Picture on overhead projector showing high and low (negative) temperatures on earth.	2 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Transparency</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Objective:</b> 1. Develop and understand the rules for multiplying negative integers. 2. Develop competency at multiplying with negative integers.	1 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Provide Input:</b> Review the cumulative property of multiplication. Extend this to groups with negative numbers. Examples without parentheses. Give rules to be listed in journal.	12 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.

<b>Model:</b> Do guided practice on the overhead, working several different multiplication problems.	8 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling (management).
<b>Check for understanding:</b> Ask questions to insure understanding. A few easy problems will be completed with student input.	3 min.	<ul style="list-style-type: none"> <li>▪ Overhead Projector</li> <li>▪ Chalkboard and chalk</li> </ul>	None.
<b>Guided Practice:</b> Do problems 1-6 in class page 128.	5 min.	<ul style="list-style-type: none"> <li>▪ Text book exercise 3.5</li> <li>▪ Overhead projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Ask for input from below-grade-level students when success is insured.(management)
<b>Closure:</b> intro. To 37.	1 min.	<ul style="list-style-type: none"> <li>▪ Chalkboard and chalk</li> </ul>	none
<b>Independent Practice:</b> Assign students page 128 & 129 Problem 36 in class 7-40 independent to be graded next day.	20 min.	<ul style="list-style-type: none"> <li>▪ Chalkboard and chalk</li> </ul>	Level of Support: Look for students having problem with independent practice. (management)

**Integration of Technology:**

None.

**Reflection:** I tried to approach this lesson from a logical prospective starting with multiplication of two positive integers and the relationship to grouping. This seemed to work well for a negative times a positive integer, but when I got to multiplying two negative integers to get a positive product, some students became confused. The proof is well beyond the capability of this class. I solved the problem by including division so that internal “inverse” operations could be demonstrated (see reflection in action). In retrospect, based on a discussion with my C.T. she said that it is easier and less confusing for the students to just get rules and be told “that is the way it is”. My conclusion is that a teacher must know the understanding level of the class, and at times, based on that level keep principles simple enough to avoid confusion. In this case a class of twelve year olds would not understand or even be interested in the rationale and were probably relieved when I rescued the lesson and focused on the rules and examples.

## LEARNING ACTIVITY PLAN # 2

**Name:** xxxxxxxx  
**Content Area:** Pre-Algebra

**Estimated Time:** 52 minutes  
**Grade Level(s):** 8<sup>th</sup>

**Achievement Target (goal)s (goals):**

**Assessments:**

<ul style="list-style-type: none"> <li>• Target (goal) #2 The students will know and understand the principles of integer division.  <i>(Knowledge)</i> <ul style="list-style-type: none"> <li>○ I.A.S. 337.02.a ; 339.01.d</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Pre-Assessment – selected response. <i>Correct response rate 12%.</i></li> <li>• Interim-Assessment.             <ul style="list-style-type: none"> <li>○ Independent practice problems.</li> <li>○ Personal communication; Class response to questions.</li> </ul> </li> <li>• Post-Assessment- Selected Response.</li> </ul>
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**Instructional Strategies:** Direct whole-group  
**Special Planning and Preparation:** N/A

**Procedures/Timeline:**

Procedures	Time	Materials	Adaptations for Students with Special Needs
<b>Pre-test</b>	0 min	Completed two weeks prior to lesson to determine level of knowledge.	None needed (see above).
<b>Anticipatory Set:</b> Pledge of Allegiance. Correct Interim-assessment LAP 1. Give an example of class grades for two imaginary students with nearly identical scores but different averages. Ask how this can happen (averages).	7 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Transparency</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Objective:</b> 1. Develop an understanding of how integer division is used in everyday life. 2. Develop and understand the rules for dividing negative integers. 3. Develop competency at dividing with	3 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.

negative integers. 4. Determine averages (see anticipatory set), do calculations based on opening question.			
<b>Provide Input:</b> List multiplication statements with matching division statements using negative numbers. Give rules to be listed in journal.	7 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Model:</b> Do guided practice on the overhead, working several different division and average problems using negative numbers.	7 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Check for understanding:</b> Activity: Cards with +/- integers and sign for division or multiplication. Ask questions to insure understanding. A few easy problems will be completed with student input.	7 min.	<ul style="list-style-type: none"> <li>▪ Overhead Projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Guided Practice:</b> Do problems 1, 29,31 in class page 134.	4 min.	<ul style="list-style-type: none"> <li>▪ Text book exercise 3.6</li> <li>▪ Overhead projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Ask for input from below-grade-level students when success is insured.
<b>Closure:</b> intro. To problems 40-42, page 135.	2 min.	<ul style="list-style-type: none"> <li>▪ Chalkboard and chalk</li> </ul>	None needed
<b>Independent Practice:</b> Assign students page 134 & 135 problems 1-43.	14 min.	<ul style="list-style-type: none"> <li>▪ Chalkboard and chalk</li> </ul>	Be available to help students with questions.

**Integration of Technology:** None

**Reflection:** This lesson was a review of the first “combination” lesson created by my reflection-in-action. This was fortunate as we had been directed by the math department to do a pre-test on problem solving which took about fifteen minutes of the period and would not have left enough time for the initially planned lesson. Unfortunately, due to the shortened time, I did not ask questions about the homework, and corrected them. There are a couple of problems that were not understood by the entire class, which I will discuss tomorrow. My C.T. does not feel the class has grasped the concept of subtracting negative integers, so tomorrow will be correction from LAP1&2 homework, and review. LAP#3 will occur one day later.

## LEARNING ACTIVITY PLAN # 3

**Name:** xxxxxx  
**Content Area:** Pre-Algebra

**Estimated Time:** 52 minutes  
**Grade Level(s):** 8<sup>th</sup>

**Achievement Target (goal)s (goals):**

**Assessments:**

<ul style="list-style-type: none"> <li>• Target (goal) #3; Students will learn to develop mathematical equations and solve story problems using integer operations.  <i>(Reasoning)</i> <ul style="list-style-type: none"> <li>○ I.A.S. 339.01.d</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Pre-Assessment – selected response. <i>Correct response rate 10%.</i></li> <li>• Interim-Assessment.             <ul style="list-style-type: none"> <li>○ Independent practice problems.</li> <li>○ Personal communication; Class response to questions.</li> </ul> </li> <li>• Post-Assessment- Selected Response.</li> </ul>
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**Instructional Strategies:** Direct whole-group

**Special Planning and Preparation:** Reserve portable computer and projector three days in advance.

**Procedures/Timeline:**

Procedures	Time	Materials	Adaptations for Students with Special Needs
<b>Pre-test</b>	0 min	Completed two weeks prior to lesson to determine level of knowledge.	None needed (see above).
<b>Anticipatory Set:</b> Pledge of Allegiance Correct Interim-Assessment. Use a quote on human intelligence and ability to solve problems. Describe algebra as a rational approach to problem solving.	5 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Transparency</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Objective:</b> 1. Communicate objective as developing a rational step approach to solving algebraic equations.	2 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Provide Input:</b> Show steps (PowerPoint) on T.V. screen. Show two problems on PowerPoint and relate to steps. Handout with step list. Have students enter rules in journal.	10 min	<ul style="list-style-type: none"> <li>▪ Computer &amp; Projector</li> </ul>	No learning disabled student identified, no adaptations needed at this point.

<b>Model:</b> Do guided practice on the overhead, working several different division and average problems using negative numbers.	6 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Check for understanding:</b> Ask questions to insure understanding. A few easy problems will be completed with student input.	3 min.	<ul style="list-style-type: none"> <li>▪ Overhead Projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Guided Practice:</b> Do problems 1,3,17,19(check answer) page 140.	3 min.	<ul style="list-style-type: none"> <li>▪ Text book exercise 3.7</li> <li>▪ Overhead projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Ask for input from below-grade-level students when success is insured.
<b>Closure:</b> intro. To 41.	1 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> </ul>	
<b>Independent Practice:</b> Assign students page 140 & 141 problems Problem 1-28, 35-46.	20 min.		

**Integration of Technology:** I created a PowerPoint slide show for this lesson. The first set of slides work through the step-by-step process to solve an algebraic equation. The second two sets then show the process of solving an equation while referring to the step-by-step process. These slides will be shown on the portable computer and projector, which I can locate in the center of the room using the existing screen.

Uses technology to enhance instruction and appeal to learners.

**Reflection:** The class was as quiet as I had seen them with no voluntary input into questions. The lesson seemed to go pretty well, but with little feedback from the students I left very unsure that they had grasp the concepts taught. After the PowerPoint presentation I did guided practice, and with difficulty determined that the students did not understand some basic concepts taught early in the year. I stopped and re-taught that any number divided by that number is one (basic for inverse operations). I also re-taught opposites of numbers. In reflection, I should have had a better idea of the common level of understanding for the class and taught from more basic principles to begin the lesson, which would have provided a more meaningful scaffold.

Perhaps the lesson to be learned here is that I tend to teach at a level that is too accelerated for this class. I have noticed that I have a better rapport and am more successful teaching the honors 7<sup>th</sup> grade pre-algebra class. A teacher will always be faced with a class that is somewhat behind expected level (see L.T. context), I should have been more aware of the class level and needs in planning my lesson approach for this class based on what I knew about their level of understanding and performance.

## LEARNING ACTIVITY PLAN # 4

**Name:** xxxxxx  
**Content Area:** Pre-Algebra

**Estimated Time:** 52 minutes  
**Grade Level(s):** 8<sup>th</sup>

**Achievement Target (goal)s (goals):**

**Assessments:**

<ul style="list-style-type: none"> <li>• Target (goal) #3; Students will learn to develop mathematical equations and solve story problems integer operations. <i>(Reasoning)</i> <ul style="list-style-type: none"> <li>○ I.A.S. <b>339.01.d</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Pre-Assessment – selected response. <i>Correct response rate 10%.</i></li> <li>• Interim-Assessment.             <ul style="list-style-type: none"> <li>○ Group presentations on selected science equations.</li> <li>○ Personal communication; Class response to questions.</li> <li>○ Independent practice problems.</li> </ul> </li> <li>• Post-Assessment- Selected Response.</li> </ul>
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**Instructional Strategies:** Teacher directed, TABA

**Special Planning and Preparation:** N/A

**Procedures/Timeline:**

Procedures	Time	Materials	Adaptations for Students with Special Needs
<b>Pre-test</b>	0 min	Completed two weeks prior to lesson to determine level of knowledge.	None needed (see above).
<b>Anticipatory Set:</b> Pledge of Allegiance Quote by Einstein. Correct Interim-Assessment.	2 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Transparency</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Objective:</b> 1. Using a rational approach to problem solving, we will do some science based problems in small groups and students discuss solution.	2 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Provide Input:</b> Assign students to groups. Give problem to each group. Have students put problems on board and show how the solution is done by steps.	22 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ <div style="border: 1px solid black; padding: 5px; display: inline-block;">The use of groups and self-assessment using a rubric adds variety in instructional methods.</div></li> </ul>	No learning disabled student identified, no adaptations needed at this point.

**An adaptation would be to group students needing more challenge with those who are below grade level.**

Teacher introduces each group by providing relevance to the problem. (rubric included)			
<b>Model:</b> Do guided practice on the overhead, working several different word problems.	3 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Check for understanding:</b> Ask questions to insure understanding. A few easy problems will be completed with student input.	2 min.	<ul style="list-style-type: none"> <li>▪ Overhead Projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Guided Practice:</b> Three independent problems.	5 min.	<ul style="list-style-type: none"> <li>▪ Text book exercise 3.7</li> <li>▪ Overhead projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Ask for input from below-grade-level students when success is insured.
<b>Closure:</b> Hand out steps in solving equations	2 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> </ul>	
<b>Independent Practice:</b> Assign students Worksheet 3.7 problems.	16 min.		

**Integration of Technology:** None

**Reflection:** This was a pretty fun activity. Again I gave the groups problems, which stretched their capability, but at the same time I provided plenty of support to insure that the students could not fail. This is a very quiet class so getting in front of the class to present how the problem was approached was difficult for most of the students. Still, they did very well, and all but one group got their problem correct. I was trying to teach a systematic approach to problem solving, as well as helping the students understand how algebra is used in the real world, and especially science. I tried to find problems that would be either interesting, or teach them more than just math. I was pretty happy with the results, and my C.T. thought it was a great activity. Examples of problems included a couple of pressure volume relationships from chemistry, a force on a bike rider in a wind, finding the temperature of the sun from the maximum intensity wave length of light emitted, finding the temperature where the F and C temperature scales cross, and my favorite, a repeat of the process Eratosthenes used to determine the earth's diameter in 250 B.C. See pages 25a thru 25i.

Used knowledge of students' interests in selecting the problems. This is an example of using contextual factors (student interests) to design instruction. (Although student interests were not mentioned in contextual factors)

## LEARNING ACTIVITY PLAN # 5

**Name:** xxxxxxxx  
**Content Area:** Pre-Algebra

**Estimated Time:** 50 minutes  
**Grade Level(s):** 8<sup>th</sup>

**Achievement Target (goal)s (goals):**

- Target (goal) #4 The students will understand how to find ordered pairs, and plot points on a coordinate plane. (*Knowledge*)
  - I.A.S. 343.02.a ; 340.03.b

**Assessments:**

- Pre-Assessment – selected response. *Correct response rate 4%.*
- Interim-Assessment.
  - Independent practice problems.
  - Personal communication; Class response to questions.
- Post-Assessment- Selected Response.

**Instructional Strategies:** Direct whole-group, cooperative.  
**Special Planning and Preparation:** Reserve portable computer and projector

**Procedures/Timeline:**

Procedures	Time	Materials	Adaptations for Students with Special Needs
<b>Pre-test</b>	0 min	Done two weeks prior so that lesson could be focused.	None, no grade, lack of completing test is indication of work level.
<b>Anticipatory Set:</b> Pledge of Allegiance Correct homework from previous day. Show a map of the world and ask how we identify different locations on the planet. (Latitude/Longitude.	3 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Transparency</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Objective:</b> 1. Learn how the coordinate plane is made up of number lines (vertical and horizontal). 2. Understand the quadrants of the coordinate plane. 3. Develop competency locating points, identifying missing points of rectangles, and finding area of rectangles.	3 min	<ul style="list-style-type: none"> <li>▪ Computer &amp; Projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.

<b>Provide Input:</b> Use algebra program or PowerPoint to show how points are found. Give rules to be listed in journal.	8 min	<ul style="list-style-type: none"> <li>Computer &amp; Projector</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Model:</b> Guided practice on the overhead, plotting several points. Show how missing points can be located two ways, and how to calculate area of a solid on the plane.	5 min.	<ul style="list-style-type: none"> <li>Computer &amp; Projector</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Check for understanding:</b> Ask questions to insure understanding. A few easy problems will be completed with student input.	3 min.	<ul style="list-style-type: none"> <li>Overhead Projector</li> <li>Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Guided Practice:</b> Do problems 2 problems in class.	5 min.	<ul style="list-style-type: none"> <li>Text book exercise 3.8</li> <li>Overhead projector</li> </ul>	Ask for input from below-grade-level students when success is insured.
<b>Closure:</b> Make a picture in coordinate plane	1 min.	<ul style="list-style-type: none"> <li>Overhead projector</li> </ul>	
<b>Independent Practice:</b> Assign students pg 144-145 1-26. Project handout figure and assign students to design a pattern and instructions for a partner to graph tomorrow.	10 min.	<div style="border: 1px solid black; padding: 5px;"> <p>Having students design a pattern and instructions for a partner to graph in Lesson 36 shows variety and appeal to students' interests.</p> </div>	

**Integration of Technology:** PowerPoint demonstration showing how points are plotted on the coordinate plane. This provides a great visual for students that learn visually. It is difficult to plot points with the only option being on the overhead projector with a transparent grid. The presentation relates the coordinate plane to the previously studied number line to help scaffold the new concept. The next day we will review this using the Quant systems CD Rom based algebra program with a section on plotting points.

**Reflection:** This presentation that is on version four went well but with much less student input than usual. Twenty percent of the school is out with the flu and the drop in numbers certainly made this class quiet. The students seemed to understand the material and did well on independent practice during the last 15 minutes of class. All indication is that the PowerPoint presentation helped them understand the material well. I had to call on class members to answer questions, and after forcing engagement they understood and answered the questions correctly.

## LEARNING ACTIVITY PLAN # 6

**Name:** xxxxxx  
**Content Area:** Pre-Algebra

**Estimated Time:** 50 minutes  
**Grade Level(s):** 8<sup>th</sup>

**Achievement Target (goal)s (goals):**

- Target (goal) #5 The students will construct graphs of simple linear equations, and figures on the coordinate plane. *(Product)*
  - I.A.S. 343.02.a ; 340.03.b

**Assessments:**

- Pre-Assessment – selected response. *Correct response rate 0%..*
- Interim-Assessment.
  - Product consisting of equations and partners figure.
  - Independent practice problems.
  - Personal communication; Class response to questions.
- Post-Assessment- Selected Response.

**Instructional Strategies:** Teacher led, small group.

**Special Planning and Preparation:** N/A

**Procedures/Timeline:**

Procedures	Time	Materials	Adaptations for Students with Special Needs
<b>Pre-test</b>	0 min	Done two weeks prior so that lesson could be focused.	None, no grade, lack of completing test is indication of work level.
<b>Anticipatory Set:</b> Pledge of Allegiance. Correct homework, hand in picture assignments. Use clothing store example (prob. 40) page 145 as example for use of linear equations.	3 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Transparency</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Objective:</b> 1. Learn how to rearrange linear equation into the slope intercept form. 2. Learn substitution method of graphing a linear equation. 3. Understand the relevance of a linear equation.	3 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.

<b>Provide Input:</b> Show what a graph of a single set solution looks like. Ask what the solution to a two variable equation will look like in graphical form. Describe a linear equation Give rules to be listed in journal.	5 min	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Chalkboard and chalk</li> </ul>	No learning disabled student identified, no adaptations needed at this point.
<b>Model:</b> Guided practice on the projector using graphing CD program “Intermediate Algebra” by Quant systems. Graphing linear equations with student input.	12 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> <li>▪ Marker</li> <li>▪ Computer</li> <li>▪ Projector</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Check for understanding:</b> Ask questions to insure understanding. A few easy problems will be completed with student input.	3 min.	<ul style="list-style-type: none"> <li>▪ Overhead Projector</li> <li>▪ Chalkboard and chalk</li> </ul>	Look for opportunity to get less active and below-grade-level students involved in modeling.
<b>Guided Practice:</b> Do problems 2 problems in class.	5 min.	<ul style="list-style-type: none"> <li>▪ Text book exercise 3.8</li> <li>▪ Overhead projector</li> </ul>	Ask for input from below-grade-level students when success is insured.
<b>Closure:</b> intro. To 37.	1 min.	<ul style="list-style-type: none"> <li>▪ Overhead projector</li> </ul>	
<b>Independent Practice:</b> Page 144-145 27-45 and graph partner’s points on provided grid. Chapter. Test Wed.	10 min.		

**Integration of Technology:** Using a C.D. Rohm based algebra tutorial I will guide the class through the coordinate plane and graphing. I am using this medium because overheads projectors are hard to see a grid on, and the chalkboard is impossible to draw a grid on and work with.

**Reflection:** Students really got involved in the exercise; unfortunately the class period was shortened by about ten minutes. Because graphing linear equations is not a mastery skill at this level, we used this program to introduce the material and gain a little bit of practice. These students will not see graphing again until perhaps the last three weeks of the school year. Perhaps they will remember this exercise and retain a bit more of the material.

# INSTRUCTIONAL DECISION MAKING

## Example #1

My first lesson was designed to teach multiplication of integers. Although the students had experience with positive integer multiplication, the new material included negative integers. I had planned to present the material much the way positive integer multiplication had been taught-- as grouping of numbers. This worked well for multiplication of positive and negative integers, however when I got to two negative integers, the class became confused. This was evidenced by facial expressions on several of the students and many hands being raised from other students. It was obvious that I had lost them at the point of multiplying two negative integers together to get a positive integer.

- **Analysis of Problem**

The first major glitch to my lesson plan had happened on the first day, with almost no experience behind me, a feeling of panic quickly flooded over me. It was obvious by what was becoming a chorus of questions and comments that the students were thoroughly confused and two students had become argumentative over the idea that two negative numbers multiplied together could be a positive. My first response was to gain order in the class and then ask several of the students to explain what they understood and what they found confusing. The issues then became two fold and I attempted to address them separately.

- **Modifications**

The first issue was identified as confusion by several students between the operation of adding two negative numbers and multiplying negative integers. This confusion was easily handled on the board by reviewing the addition of two negative integers to get a larger negative integer. I then repeated the multiplication of a negative integer by a positive integer to show that the groups of

negatives were identical to summing negatives to get a negative. I related the operations and eliminated that confusion.

Explaining the multiplication of two negative integers to get a positive integer was more troublesome, and I decide on the spot to go back and start over teaching both integer multiplication and division together so that the inverse operations could be used to “prove” the rules. I also became much more rule-based at this point and tried less to scaffold the information to past experience.

Clearly I had to eliminate the confusion over different operations (multiplication versus addition) and accomplished this easily. By going back to a rule-based approach and handling both multiplication and division (lesson 2) together, I was able to give the same rules for both operations allowing some consistency for the students. I was also able to check my multiplication problems with the inverse operation of division, and division examples with multiplication to tie both operations together.

Uses best practice and knowledge of student needs (need for more structure and consistency) to explain why the modifications would work.

### Example #2

The third lesson plan took place on my fourth day of teaching because of shortened class periods and the decision to provide more practice on addition and subtraction. I was showing the students the four operations necessary to solve a single-step algebraic equation. I had taught the principles on a PowerPoint presentation and was doing guided practice on the board. The steps involving clearing the coefficient of the variable with the inverse operation presented issues with many of the class members.

- **Analysis of Problem**

As I asked students to provide the next step in the solution, most were unable to provide the correct response. After a couple of comments from students I realized that they were lacking knowledge that should have been learned in fifth grade math. The question was identified as “why

do you divide the variable and coefficient by the coefficient?” Or put in another way, “Why use inverse operations?” I asked several students to answer simple division problems with the numerator and denominator being the same, and most did not give the correct response.

- **Modifications/ Adaptations**

I proceeded to teach a simple math lesson on inverses with examples of  $5/5$  or  $5 \times 1/5$  being equal to one. Similarly I ask what inverse operation would be used for a fraction like  $1/4$  or  $3/5$ . After working through numerous examples, I then could make the comment that any number divided by itself was always one, which helped explain the rationale for using inverse operations to clear coefficients on a variable to get one unit of variable.

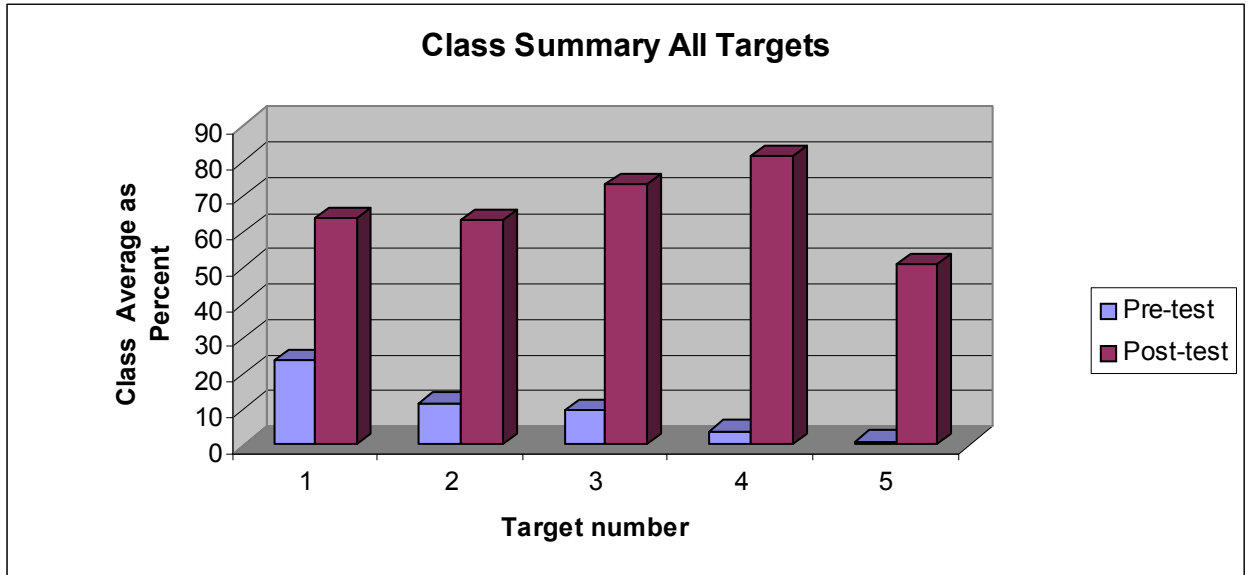
It was important for the students to understand why they were making the operations they were making on an algebraic equation. They lacked basic understanding of number operations that were necessary for them to understand why they were dividing or multiplying to clear the coefficient. And because they did not understand why, they could not choose the correct operation. This is basic information, which needed to be mastered to be successful in the following units of study.

## ANALYSIS OF STUDENT LEARNING

The results from the pre- and post-assessment are provided for 27 of the 29 students in the class (one student had transferred). Two of the students were out for several days after the post-assessment was made, and are omitted from this report. All students were present for the pre-assessment, which was given about one week prior to my teaching sequence.

Results of the pre-assessment suggested that the student level of understanding for the principles I was to teach were not well understood. Since the students already had taken one pre-assessment for my partner teacher, they understood that it would not affect their grade. As a result, I suspect that many of the students failed to correctly answer questions that they could have answered. The reader will note the very low pre-assessment scores in nearly all areas which could bias the results. I did follow up with the students on target goals #3 and #4, and would say that almost none of the students had been introduced to solving equations and the coordinate plane. This information helped me choose these target (goals) for analysis, as I believe the pre-assessment results are more accurate.

Both the pre- and post-assessments were short-answer selected-response with no options given. They required solving mathematical problems or algebraic equations. This tends to create lower scores because lucky guesses (multiple choice) do not occur.



**Target (goal) #1 Integer Multiplication**

**Target (goal) #2 Integer Division**

**Target (goal) #3 Solving Algebraic Equations**

**Target (goal) #4 Coordinate Plane**

**Target (goal) #5 Graphing Linear Equations**

(Target goal #5 was simplified as “introductory” and given as extra credit on post-assessment).

#### **Whole Class Learning on Entire Test:**

I have included results of all five target goals.

It should be noted that the cooperating teacher and

I altered Target (goal) #5 as she realized that graphing linear equations was an introductory (not mastery) level subject. My post-assessment gave a linear equation as extra credit as was done also in the C.T.’s fifth period post-assessment.

NOTE that the Renaissance TWS requires analysis of whole group performance on each separate Learning Goal.

**NOTE: The Renaissance TWS suggests separate sub-sections for the Whole-Class (all goals), Subgroups (one goal), and Individuals (2 students for two goals).**

**This university requires the student teacher to discuss ONLY the Whole-Class and Subgroup results for two Target Goals. Some discussion of individual student performance is provided.**

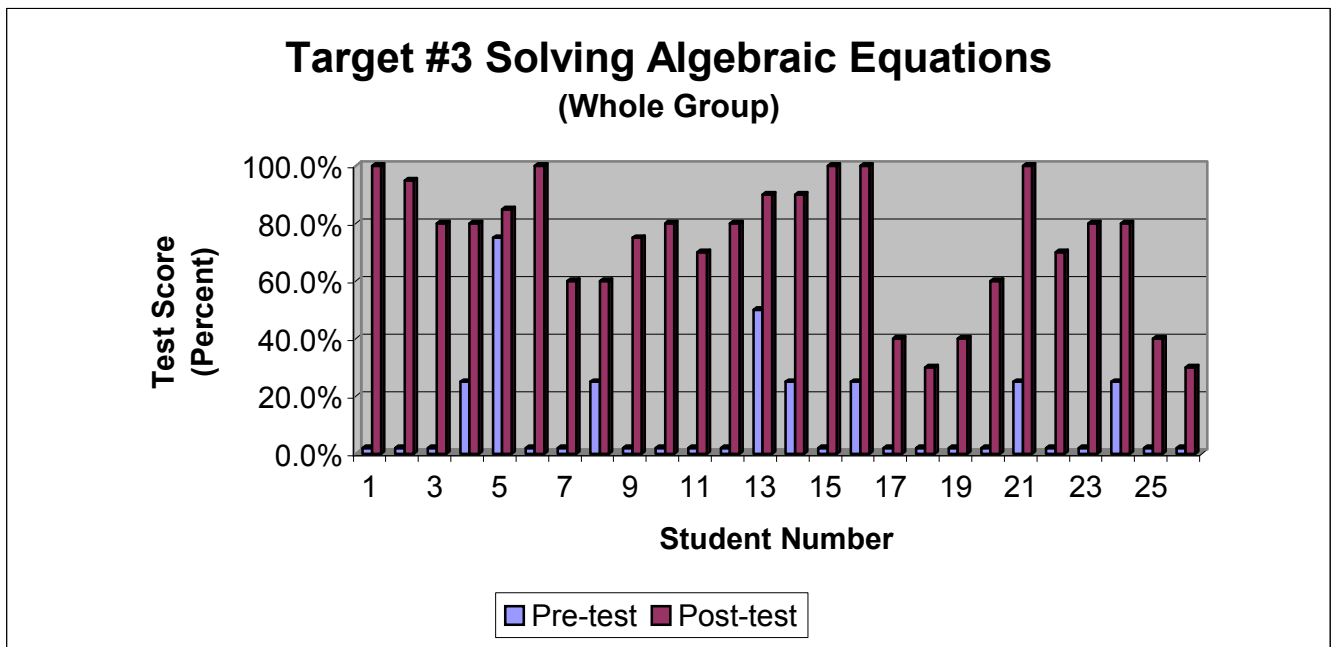
**Whole-Group and Subgroup Performance on 2 Learning Goals:**

Explains why more success occurred on these 2 goals.

For the two target (goals) I will analyze separately (#3 and #4), most of the work was done in-class with hands-on learning projects. Students prone to avoiding homework performed better on these target goals. My subgroup was determined as students who either had IEP's (these were non-math), or those who we perceive as below class level, based on previous performance and their general attitude that they are not smart enough to do math. It is important to identify this group because it is the teacher's responsibility to identify additional help needed by these students so they can catch up to the class and succeed.

Explains who the subgroup is, and explains why this group is important.

**Target (goal) #3 Solving Algebraic Equations:**



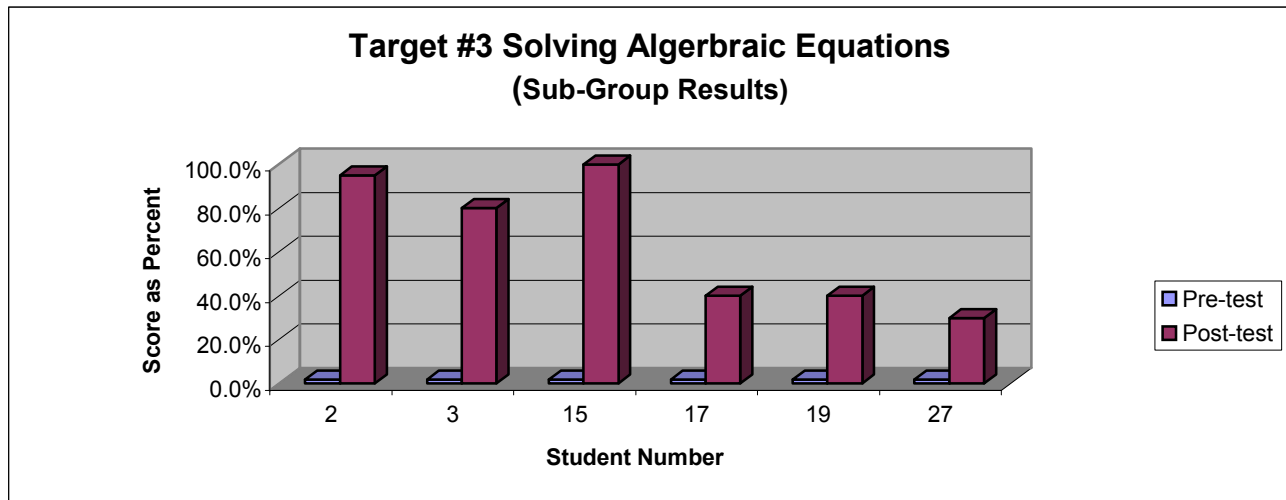
Twenty-two of the 27 students exceeded my goal of 75% on this target (82%), meeting my goal of 80% of the students. This post-assessment included four problems requiring each of the four methods for solving. The problem missed most frequently was one requiring the division by -3. Many students dropped the negative sign, giving them the wrong sign on the answer. The second

Nice analysis of which items were problematic for students, with some attempt to understand why.

most missed problem was one requiring the student to add the opposite of  $-6$ , which is  $+6$ ; again many used the wrong sign on the opposite.

In general I am pleased with the results. Most of the class demonstrated proficiency at solving single-step equations. This is the most important target (goal) of the five, given that the following chapter requires proficiency at this point to succeed at solving two- and three-step equations.

Subgroup Results: Six students had non-math IEPs or were below grade-level in math. As can be seen, three of these students did very well on the post assessment, with student 15 scoring 100%. Of the three students falling below 40%, student 17, and student 19 failed to do the homework assignment, although student 17 handed the work in the day after the post-assessment.

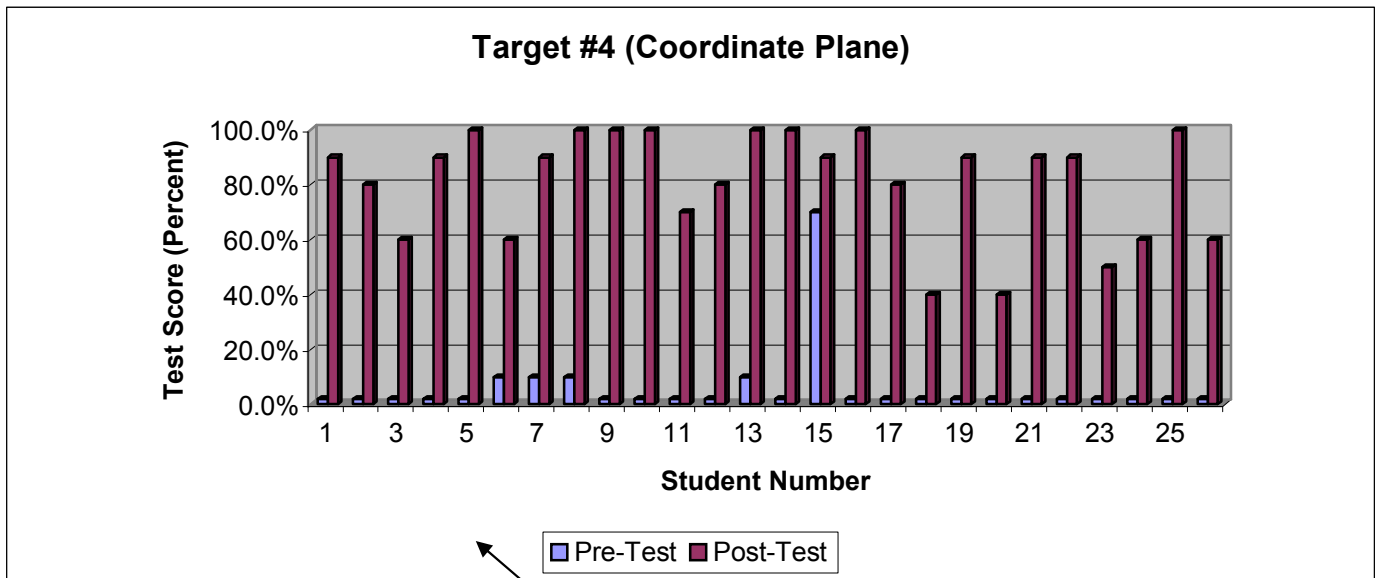


Most unfortunate is student 27, who worked hard to do assignments and struggled with negative integers through both addition/subtraction and multiplication/division. Although all six students increased their level of proficiency significantly, three are below the level required to be successful in the next section without some teacher intervention.

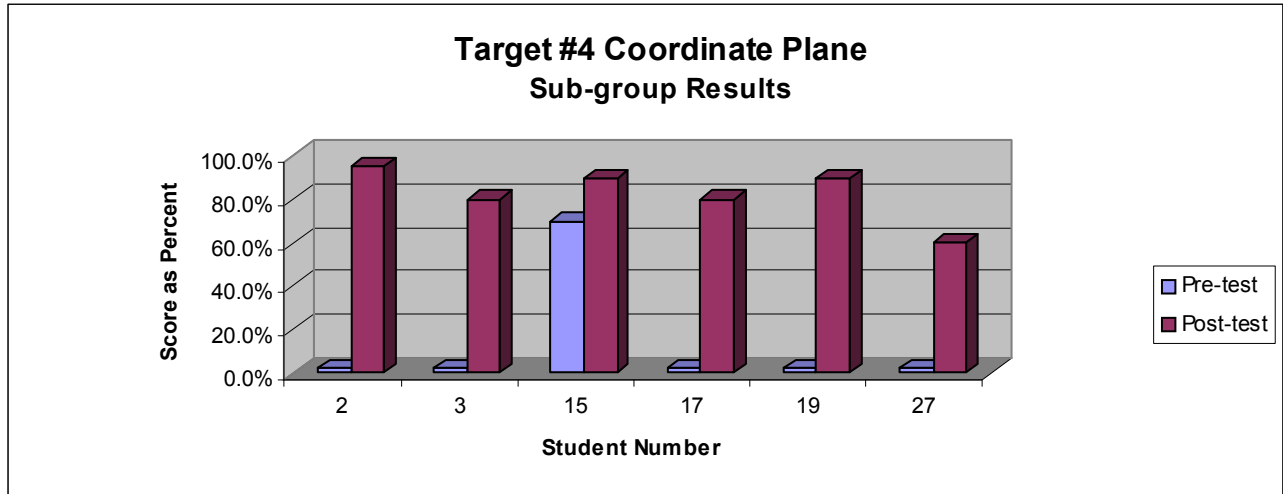
Example of a meaningful interpretation, with appropriate conclusions drawn (implications for teaching of next unit).

## Target (goal) #4 Coordinate Plane

This lesson was also taught with a PowerPoint presentation, but we cut short the practice using an algebra CD program due to time constraints and the decision by the C.T. that both pre-algebra classes would not spend the time needed to master linear equations. Although there was only one assignment (homework) given for this target goal, students did extensive in-class practice, plus an interim (formative) assessment product. Only one student had seen and remembered this information from the pre-assessment. It was clear that a majority of the class had done some work in the coordinate plane but had forgotten most of what they knew. The pre-assessment for this target (goal) has only 4% correct answers as a class, while on the post-assessment the students averaged 82% correct as a class. For this target (goal) six students failed to score 75% or above on this section of the post-assessment, leaving 78% of the students scoring 75% or higher on the post-assessment.



Profile of student learning is comprehensive and presentation is easy to understand.



Subgroup Results: Again, this shows a wonderful improvement, but one student shy of my goal (80%). All but one of the subgroup performed well on this target (goal). Student 27 got only 60%, as she successfully identified points and quadrants on the coordinate plane, but failed to find the fourth point in a rectangle and the area of the resulting rectangle. This class will not see the coordinate plane again until the last three weeks of the semester.

Includes discussion of individual student learning.  
**Lacks a discussion of why the student had this problem.**

## REFLECTION AND SELF-EVALUATION

My goal of having 80% of the class achieving at least 70% on the entire post-assessment was not met. Seven of the 27 students scored below 70% and 75% of the class scored over 70%.

The class average on the post-assessment was 78%, including eight A's, and six B's (half of the class). This result is typical of normal class performance on prior units of study. Of the eight students that scored below 70%, six of them also failed to do assigned independent practice. This has been and remains a strong indicator of success on assessments, as practice of new principles is critical.

Useful (not required) to set a minimum level of desired performance.

In order for me to have reached the goal of 80% of the class scoring 75% or above on each target (goal), I needed 22 successful students. I met this goal for target (goal) #3, but fell one student short on target (goal) #4. This teacher work sample has taught me just how difficult it is to help each child be successful. Graphing the results really helps identify the extent of what was learned as well as helping identify which students are failing to learn certain target (goal) material.

In general I think teachers look at overall grades and fail to identify what important knowledge is lacking. For instance, on my first class-wide graph,

one can see that much of the problem with this class stems from poor performance on goals #1 and #2

Explores a hypothesis for why some students did not meet learning goal #3.

(basic skills of positive and negative integer addition, subtraction, multiplication, and division).

(The average was 20% on pre-test, and 60% on post-test). The one question on averages was missed by many students because they could not sum positive and negative integers successfully. Given these results, I would go back and focus on these four key operations and solving equations before moving on to solving multiple-step equations.

Provides ideas for redesigning instruction to improve student learning. **More detail needed about how this would be done, and why this would help.**

It is critical to identify students who may need additional assistance early so that they can be given more focus early. Although we did not identify a specific group needing adaptations, this data suggests otherwise. We knew we had some below-grade-level students, and in retrospect, the data shows that they are not progressing sufficiently. Perhaps peer tutors would work for those students who struggle in spite of their best efforts, like student 27.

Provides another instructional modification to improve student learning. **Needs to explain why this might help learning.**

**Most Successful Learning Goal:**

Student learning appears to be much better on target goals #3 and #4 as compared to target goal #1 and #2. I have left target goal # 5 out of this analysis because it was determined by my C.T. that this was an introductory target, hence we reduced instruction for this goal and the post-assessment was used as extra credit only. The analysis by target goals suggests strongly that my direct instruction for targets #1 and #2 was far less effective than it was for targets #3 and #4 where instruction involved students more actively (e.g., PowerPoint presentations that help solicit student response, and group activities or projects that provide practice opportunities).

All math teachers at XXX are encouraged to follow the text both in material and approach. Because the district continually checks on class progress, it is critical to follow the subject matter in the text, but I found student learning improved when I stepped into activities that supported the book's lesson without using the book's approach. In the future, I would look to other texts and methods from those texts and try to use the methods most likely to be understood by the student rather than try to mirror the methods of the text I am handed.

Explores hypotheses for why these teaching approaches helped students achieve Targets #3 & #4.

**Least Successful Learning Goal:**

Passive learning as I provided in lessons #1 and #2 were not very successful. Once I got into active learning on target goals #3 and #4 the results were much improved. Students must hear, see,

discuss and be involved to improve learning. I fundamentally believe in the constructivist approach that students must construct their understanding. My strength is more in devising class exercises that get students involved and learning with hands-on experience. I should focus more on this technique and use direct instruction sparingly or as introduction and overview to new sections of material.

It is important that the teacher control the speed of learning to insure that the entire class is capable of keeping pace. I felt very rushed to get through the assigned material in my assigned seven class periods. In an effort to keep the first period class at the same stage as the fifth period identical class I did not give a review day before the post-assessment. This was a serious error, and I feel at least half of the students that failed to reach the 75% level would have done so with one more day of review and practice. I had barely identified struggling students and did not adequately support those students who were behind in learning because of the time constraint.

I experienced some level of frustration at the 24% of the class who did not complete homework.

I would change the grading of the homework to help eliminate the lack of interest by the students. As a permanent teacher I would intervene with parents quickly to insure that there was support at home to get homework completed. Mathematics and science requires the student to practice principles learned. If students do not practice, they will perform poorly on post-assessments and will generally not learn important principles.

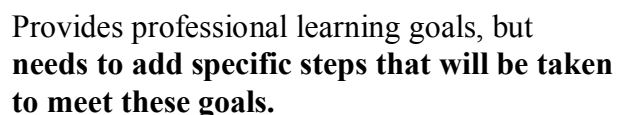
Acknowledges weaknesses in instruction and adaptations needed for struggling students: more practice, assessment, etc.

**Possibilities for Professional Development:**

I would identify two areas where I will seek development. First, my most critical development need seems to be in the organization and identification of key math principles. . Well in advance the teacher must have a good understanding of the fundamentals to be learned. In other words, identify what is critical for students to learn and what is nice if time allows after mastery of

the critical knowledge is demonstrated. This will not likely be clear in the textbook I will be given. I need to plan the entire year to make sure key principles are introduced and understood in proper sequence. Then I need to provide adequate time to insure key principles are learned well before tackling optional material.

Second, in the future, I must speak or tell less, ask more questions of students, and provide more stimuli for discussion. That seems to be where the learning took place. I must wait longer for students to respond to questions I ask in class. Again, the material is second nature to me, and I get in a hurry to get the response and move on to more information. This tends to leave students behind, and I must recognize that if quick responses are not coming, it is a sign that many of the students do not understand. I must become far more patient with student learning.



Provides professional learning goals, but **needs to add specific steps that will be taken to meet these goals.**

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