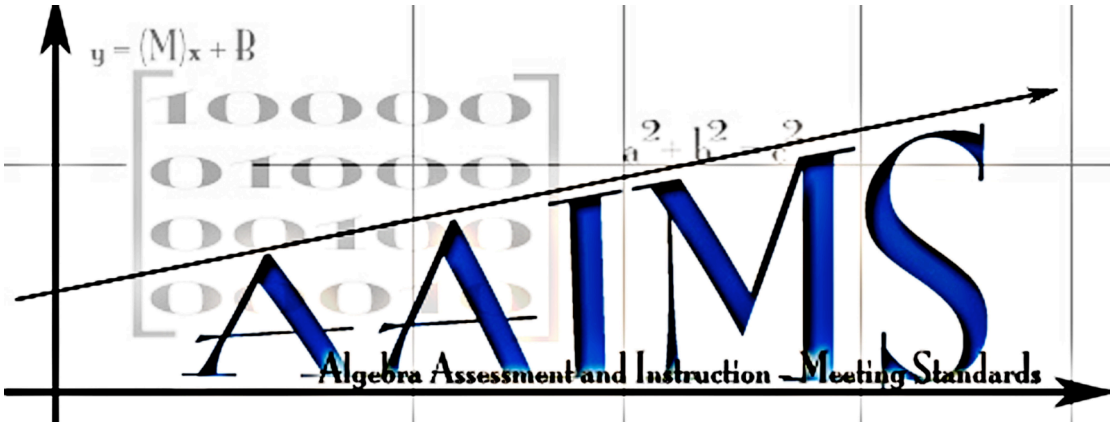
PROJECT AAIMS: ALGEBRA ASSESSMENT AND INSTRUCTION – MEETING STANDARDS



Classroom Observation Data for District A:

Anecdotal Observation Results

Technical Report #3

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Executive Summary

This report documents the results of anecdotal observations conducted in District A during the spring of 2004. It describes the algebra topics addressed during our observations, the expected tasks (class activities), teacher actions, and student actions in six different beginning algebra courses this district. We looked at the similarities and differences in the algebra curriculum for students with and without disabilities in the different algebra courses, the ways that class periods were structured in these classes, the kinds of instructional approaches that were used in general education and special education algebra courses, and students' responses to these instructional approaches.

We did not find major differences in the beginning algebra curriculum for students with and without disabilities. The vast majority of students with disabilities were enrolled in general education algebra classes. For the six special education students who were not, they studied the same or similar topics to the students in the Algebra IA class. Class structure was most influenced by the classroom teacher and not the ability level of the students enrolled in the class. One general education algebra teacher taught three different courses, which all had a similar class structure, which was different from the structure used by the general education teacher who taught the eighth grade Algebra I class. The two special education teachers also used different class structures for the classes they taught. Most teachers used traditional instructional approaches with very little time devoted to teacher-led instruction and more time devoted to providing individual student assistance, except in the eighth grade Algebra I class where we observed teacher-led instruction during more than half of the observation segments. The most typical productive student action was working on assignments in all but the eighth grade Algebra class. The students in this class spent the most time engaged in guided practice activities, as well as asking and answering questions. Nonproductive student actions were observed in at least 50% of the observation segments in Algebra Special Education, Algebra IA, Algebra IB, and Algebra I. In Algebra Special Education, the most typical nonproductive student actions were non-math activities, while off task behavior was the prevailing nonproductive student action in the other three courses.

Overview

Access to general education curriculum has become a major emphasis in the education of students with disabilities since the 1997 reauthorization of the Individuals with Disabilities Education Act (IDEA 1997). Access includes having meaningful participation in and sufficient opportunities to make adequate progress toward the district and state standards (Baker, Gersten, & Scanlon, 2002). Although this access does not necessarily require that instruction be delivered in general education settings by general education teachers, a growing proportion of students with disabilities are receiving a large proportion of their math instruction in this manner. One of the objectives of Project AAIMS is to examine the alignment of algebra curriculum, instruction, and assessment for students with and without disabilities. This report summarizes one portion of our efforts to further explore this issue.

To determine the extent to which algebra[1] instruction, curriculum, and assessment for students with disabilities is aligned with that of their non-disabled peers, the research activities imbedded in Project AAIMS included multiple means of gathering data. Two types of classroom observations were conducted concurrently. The first type used a systematic, momentary time sampling observation system, while the second type used an anecdotal observation form to document aspects of instruction that may not have been captured with the former system. In addition, interviews were conducted with teachers, administrators, and curriculum specialists to gather additional information about curriculum, instruction, and assessment at the district, building, and classroom level. Finally, school district documents related to instruction and assessment were reviewed as an additional source of information. Eventually, all of these sources will be integrated to develop a case study of each of the three participating districts.

This report documents the findings from the anecdotal observations conducted in District A during the spring of 2004. The following research questions are addressed:

1) How similar is the algebra curriculum for students with and without disabilities?
2) How are beginning algebra class periods structured?
3) What kinds of instructional approaches are used to help students learn algebra in general and special education?
4) How do students with and without disabilities respond to these instructional approaches?

METHOD

Setting and Participants

Setting

District A serves four small towns and the rural agricultural areas between these towns. Approximately 7,000 people reside in the school district. The junior/senior high school has an enrollment of approximately 600 students; about 12 percent of these students receive special education services. Approximately 13 percent of the district's students are eligible for free and reduced lunch, and three percent are of diverse backgrounds in terms of race, culture and ethnicity.

Three years of mathematics are required for graduation in District A. Consequently, virtually all students must complete an algebra course. At the time of this study the district's junior/senior high school offered several alternatives for algebra instruction. Advanced students could take algebra in 8th grade, one year ahead of the typical timeline. At the high school level, students could choose between Algebra I, the traditional course, taught over the course of an academic year, or Algebra IA and Algebra IB. With the Algebra IA/IB option, students take two years to study what is taught in Algebra I. This slower pace was intended to allow additional time to master the concepts of algebra for students who might experience difficulty with this subject. In addition to these options, students who were receiving special education services and had a math goal on their IEPs could choose to enroll in either PreAlgebra Special Education or

[1] Throughout this report any time we refer to algebra, we mean beginning algebra classes such as Algebra 1 or Pre-Algebra.

Algebra Special Education, which were taught by special education teachers. While the majority of general education students took Algebra I in ninth grade, there were some 10th, 11th, and 12th grade students enrolled in most of the various algebra options.

Participants

Study participants included general and special education teachers and general and special education students. Four teachers from District A consented to participate in this study. Students in these teachers' algebra classes were invited to participate in project activities. Parent and student consent were obtained for the use of individual scores and demographic information that were used in the analyses for other technical reports. However, since this report focuses on group data gathered during observations of public behavior, our observations were not limited to only those students for whom both parental and student consent were granted.

General and Special Education Teachers. Participating teachers included two general education algebra teachers (one high school teacher and one middle school teacher) and two special education algebra teachers. All of the teachers held standard Iowa teacher's licenses. One general education teacher had a 7-12 mathematics endorsement, while the other had a K-6 mathematics endorsement and a middle school endorsement. Both of the special education teachers had special education endorsements. Two teachers had additional graduate work beyond a Bachelor's degree and one of the special education teachers had a Master's degree. All of the teachers had at least three years of teaching experience (range 3 to 24 years) and a minimum of two years teaching algebra (range 2 to 4 years). The middle school general education teacher taught the eighth grade Algebra I class. The high school general education teacher taught five algebra classes (three Algebra I classes, one Algebra IA class, and one Algebra IB class) throughout the day. One special education teacher taught a course titled PreAlgebra Special Education to a small group of students with disabilities, while the other taught Algebra Special Education to another small group of students with disabilities identified as having deficits in the area of mathematics.

General and Special Education Students. Student participants included youth in grades eight through twelve (age 13 to age 18) who were currently enrolled in a beginning algebra course. Fifteen students were enrolled in the eighth grade Algebra I class, a total of 63 students were enrolled in the three Algebra I classes with a range of 14 to 25 students per class, 29 students were enrolled in Algebra IA, 28 students were enrolled in Algebra IB, four students were enrolled in Special Education Algebra, and two students were enrolled in the special education PreAlgebra course. Of the 141 students taking algebra, about thirteen percent were special education students. Six of these students received algebra instruction from a special education teacher (those in PreAlgebra Special Education or Algebra Special Education.) The remaining special education students received algebra instruction in general education algebra classes.

Data Collection Procedures

A primary objective of this study was to describe what happened during our observations of different algebra classes. Each class was observed three times over the course of a month near the end of the school year. (See Table 1 for the details of the observation schedule.) At least two observers were present for each observation. One observer recorded momentary time sampling

data using the SOS-AAIMS instrument (See AAIMS Technical Report #1, Olson, Foegen, & Lind, 2006.) while the other took handwritten notes on an anecdotal recording form. (See Appendix A for a copy of this form.)

Table 1. Observation Schedule

	Pre-Alg SpEd	Alg SpEd	Alg IA	Alg IB	Alg I	Alg I	Alg I	8th Alg
Obs 1	4/05/04	3/31/04	3/30/04	4/19/04	3/31/04	3/31/04	4/02/04	4/07/04
Obs 2	4/27/04	4/08/04	4/23/04	4/21/04	4/02/04	4/02/04	4/07/04	4/21/04
Obs 3	4/30/04	4/22/04	4/29/04	4/29/04	4/07/04	4/07/04	4/21/04	4/29/04

There were several major differences between the two observation techniques. The first difference was the length of the observation intervals. With the momentary time sampling procedure, the intervals were only 15 seconds, while the anecdotal observation segments were five minutes long. The second difference was the codes used to analyze the data. Whereas the momentary time sampling procedure used predetermined codes for teacher behavior, student behavior, instructional organization, and task format, the codes for anecdotal observations were developed after the observations occurred. Finally, the researchers could use more than one code for each category of interest (expected tasks, teacher actions, and student actions) for each segment of the anecdotal observations, while only one code could be chosen during the momentary time sampling observations.

The AAIMS Technical Report #1 (Olson, Foegen, & Lind, 2006) includes the findings from the momentary time sampling observations. This report addresses the findings from the anecdotal observations. As we indicated earlier, the observers used the anecdotal recording form in Appendix A to note what was going on in the beginning algebra classes that were included in this study. This form had observer instructions, a column to record the times for each five minute interval, and a column for anecdotal notes. The instructions directed observers to focus on academic content, teacher actions, student actions, and classroom activity. These handwritten notes were transcribed into Word files which were printed to start the process of developing the coding system that we used for this study.

We analyzed the anecdotal observation data by developing a hierarchical coding system using constant comparison methods (Blank, 2004; Richards & Richards, 1995; Tesch, 1990). This iterative process began with the principal investigator, the project coordinator, and a research assistant gathering to discuss possible codes for the data we had collected based on our observation experiences. During this meeting we brainstormed some potential codes for each of three categories of interest including: expected tasks, teacher actions, and student actions. Expected tasks were the activities that the teacher intended during a particular time period. As one might guess, teacher actions were what the teacher did during a segment and student actions were the behaviors students displayed during a segment. (See the Project AAIMS Anecdotal Observation Manual in Appendix B for the final set of codes and their definitions.)

After some discussion, we decided that teacher actions and student actions would have at least two levels of coding. First of all, we would determine whether or not a teacher action was instructional or non-instructional. Then we would note the specific teacher action. For student

actions, we first considered whether the action was productive or nonproductive. In other words, did the students' actions during an observation segment contribute to their understanding of that day's algebra topic (productive) or not (nonproductive)? Next, we assigned a more specific code reflecting the observed student behavior. With this preliminary list of codes in hand, each member of the research team independently examined the same set of two observation reports to verify that the codes we had brainstormed would work for the data we had collected. We wanted to ensure that our codes would be applicable for both general education and special education classes so we selected one observation report from a general education class and another from a special education class.

At our next meeting we discussed new codes we decided were necessary and changed some of our initial codes. We also determined that we needed an additional level of codes for teacher actions related to teaching new skills or procedures. In addition, we discussed specific intervals where we disagreed about code assignments, which helped us refine the definitions for each of the individual codes. We determined that we could use more than one code for each category of interest for each five-minute segment because it was not possible for the coder to determine the most prevalent behavior during an interval from the observation reports.

We repeated the process with the new codes and decision rules. The level of code agreement among the three members of the research team ranged from 53% to 88% for this round. Once again, we discussed why we disagreed about the codes we assigned to particular text segments in the anecdotal observations. These discussions led to even more precise code definitions. After three rounds of code refinement using different sets of observations, the team concluded that we had sufficient agreement (at least 95%) to begin the final round of coding. The research assistant recoded all of the previous observations using the finalized list of codes. (See Appendix B for this list.) The project coordinator spot checked the completed set of coded observations.

The final set of codes included eight codes for the expected task. For example, E-WU was used to indicate a warm up activity, E-TLI was used when teacher led instruction was observed, and E-NM was marked when a non math activity occurred (i.e. the class playing a game of hangman when an assignment was completed).

As we described earlier, teacher actions were first sorted into instructional and non-instructional categories. There were six teacher actions that were considered instructional[2]. These ranged from checking homework, to leading a review, and to teaching a lesson. The teaching a lesson category was further subdivided into four more specific teacher actions including explaining, modeling, questioning, and providing individual or small group assistance. There were four teacher actions that were deemed non-instructional. These included behavior management, task management, being out of the room, and doing something that was not related to algebra.

[2] Only five instructional teacher actions were observed in District A. Teachers never administered a test or quiz during our observations of beginning algebra classes in this school district.

The team generated eight codes for productive student actions and three codes for nonproductive student actions. Some examples of productive student actions were asking questions, participating in guided practice activities, and working on assignments during class time. Nonproductive student actions included being off task, working on an assignment or studying for a different class, and being disruptive.

Once the research assistant had hand coded the printed observations, the next step was to transfer the hand coded data into an electronic form for additional analysis. We chose to use a qualitative analysis software program called Qualrus from The Idea Works (www.qualrus.com) to analyze the data from the anecdotal observations. To do this we imported each observation as a separate source document so that its individual character could be maintained even when all the observations for a specific course were grouped together. All of the possible codes were added to the software. The codes for each five-minute segment were entered by highlighting the text for each interval and selecting the appropriate ones for that particular interval. Very often more than one code was assigned to an observation interval to describe the teacher or student behavior during an interval. However, this was not often the case for a segment's expected task. In addition, the research assistant added the topic being addressed during a particular class period as an additional code, if this was noted in the anecdotal record. Any content information was coded as content-topic (e.g., content-percent and proportions or content-calculating slope). Our analysis was completed by using the "statistics" option from the "QTools" menu. This tool allowed us to see the number of times different codes appeared, as well as the frequencies for any paired combinations of codes.

Results

In all, 197 five-minute segments from 24 observations of eight algebra classes (three each) were analyzed. The database included an average of 24 total segments for a single class across the three observations, although one class had only 21 segments and one class had 30 segments. When observations were conducted on typical school days, most had ten segments. On shortened school days, the observations usually included six segments. One class only had five segments for two of the observations.

The results for each particular algebra course will be described in the next section of this report. It is important to note that these findings are based on a limited number of observations near the end of an academic year. Nevertheless, they do illustrate some important contrasts in the algebra curriculum and instruction for students with and without disabilities in District A.

PreAlgebra Special Education

We first describe results for PreAlgebra Special Education, an introductory algebra course designed for students with disabilities who have IEPs that include a math goal. Students take this math class before taking Algebra Special Education or Algebra IA. Two students were enrolled in this course. A special education teacher taught this course, which was scheduled for the last period of the school day (Period 7). This class was observed for a total of twenty-three observation segments, with ten segments during the first observation, seven segments during the second observation, and six segments during the third observation.

PreAlgebra Special Education Content

This class used *Algebra I: Concepts and Skills*, which is published by McDougal Littell (Larson, Boswell, Kanold, & Stiff, 2001a). The copyright page from this textbook indicates that this book focuses on the essentials of algebra and it was "written to make algebra concepts and skills understandable to all students." The first lesson we observed dealt with percent and proportions. During our second observation, the class was starting Chapter 6 (Solving and Graphing Linear Inequalities). The topic for this day was graphing inequalities. On the day we made our third observation, the students were solving inequalities and matching them to graphs and then solving inequalities and graphing their solutions.

PreAlgebra Special Education Expected Tasks

The expected tasks during the special education prealgebra class were very different from one observation to the next. In addition, the teacher was responsible for drop in help for students with English assignments as well as students from a general education algebra class while teaching this class of two students. During the first observation students worked on an assignment the whole class period. They could take their work to the teacher to be checked as they progressed through the assignment. The second observation was a review day with all of the time devoted to reviewing material and leading students through a series of guided practice activities. The third observation started with a question and answer review time. This was followed by guided practice and then an in class assignment that was checked by the teacher at the end of the period.

PreAlgebra Special Education Teacher Actions

Instructional teacher actions were observed in twenty-one out of the twenty-three segments that were included in the three observations of the PreAlgebra Special Education class. The most common instructional teacher action was teaching a lesson (10 segments). Leading a review was the next most typical with eight segments, and the third most prevalent instructional teacher action was performing academic monitoring (4 segments). Teaching a lesson included providing individual student assistance during seven segments and modeling algebraic skills during three segments.

Non-instructional actions were noted during seven segments of these observations. (Five of the segments were also labeled "instructional".) The PreAlgebra Special Education teacher displayed two types of non-instructional teacher actions. These were engaging in non-math activities (5 segments) and managing behavior (3 segments). Unlike the general education teachers, the special education teachers were expected to monitor and assist additional students with a variety of subjects while their prealgebra or algebra classes were in session. This expectation may have contributed to the number of non-instructional actions, (i.e. engaging in non-math activities) that were noted during our observations.

PreAlgebra Special Education Student Actions

Student actions were first classified as productive or nonproductive. As we described previously, productive student actions are assumed to be related to algebra learning, while nonproductive student actions do not contribute to algebra learning. Students in this class displayed productive student actions for all twenty-three segments of our observations. Most often there was a code for productive student actions related to the expected task and a code for off task behavior.

By far the most common productive student action was completing assignments during class time (14 segments). The next most frequent student action was participating in guided practice activities (6 segments). Students checked their homework during three segments, and they spent the same amount of time listening. Students asked questions during one segment.

The PreAlgebra Special Education students also exhibited nonproductive student actions for three segments of our observations. Off task behavior was the only type of nonproductive student action we observed in this class.

PreAlgebra Special Education Interactions Between Teacher Actions and Student Actions

The combination of instructional teacher actions and productive student actions that occurred most frequently was teaching a lesson and working on an assignment (9 segments). Most often, this teaching was in the form of providing individual student assistance while the students worked on their assignments (7 segments). During four segments the teacher performed academic monitoring while students worked on their assignments. When the teacher led a review, the students were most often engaged in guided practice activities (4 segments), the next most common student action was listening (3 segments), and students asked questions during one review segment. The last combination of instructional teacher actions and productive student actions included the teacher modeling how to solve algebra problems while students participated in guided practice activities, which occurred during two segments.

There was only one instance when non-instructional teacher actions were paired with nonproductive student actions. This occurred when the teacher was managing some off task behavior.

Algebra Special Education

Next we describe the results for Algebra Special Education, which was reported to be the special education equivalent of the Algebra IA general education course. This special education course was offered to students with disabilities who had math goals on their IEPs who would benefit from a smaller class size, with the potential for more individualized instruction than the larger Algebra IA general education course. Four students were enrolled in this class (as compared to 29 in the Algebra IA class). A second special education teacher taught this class, which met at the beginning of the school day (Period 1). This class was observed for a total of twenty-eight observation segments, with ten segments during each of the first two observations and eight segments during the third observation.

Algebra Special Education Content

This class used an algebra book published by the American Guidance Service (Haenisch, 1998) that was designed for students who need additional help in understanding new concepts in algebra. It uses a step by step approach and has a reading level of 3.5. The students worked on a worksheet addressing reading graphs and charts and using basic statistics related to measures of central tendency (mean, median, and mode) during the first observation. During the second observation the topic for the day was graphing linear equations, and for the third observation, students practiced calculating slope values.

Algebra Special Education Expected Tasks

The expected tasks in the Algebra Special Education class varied from one observation to the next. The most common task during the first observation was working on a worksheet. During the next observation, the class started with a short review which was followed by an assignment, and the third observation began with a slightly longer lesson followed by a short assignment and more than ten minutes of non math activity. As students finished their assignments, they could read the newspaper, work on assignments for other classes, or play cards.

Algebra Special Education Teacher Actions

The Algebra Special Education teacher displayed instructional actions during fifteen of the twenty-eight segments we observed. The most prevalent instructional teacher action was teaching a lesson (10 segments). Two segments included checking homework and there were two segments when the teacher performed academic monitoring. The teacher led a review during one segment. The segments that were coded "teaching a lesson" included eight segments when the teacher provided individual student assistance, one segment when the teacher was providing an explanation, and one segment when the teacher presented new content.

Non-instructional teacher actions were noted during nineteen segments. (Six of these segments included both instructional and non-instructional actions.) This special education teacher was expected to help students who came to the room for assistance with other subjects while the algebra class was meeting, which may have contributed to the large number of non-instructional actions that were noted during our observations. We observed the teacher engaging in a non-math activity during nine segments. She managed tasks during nine segments, and she managed behavior during three segments. There was one segment when the teacher was out of the room.

Algebra Special Education Student Actions

Algebra Special Education students engaged in productive student actions during twenty-three segments of twenty-eight observation segments for this course. There were twenty segments when at least one student was working on an assignment. Students verbally answered questions during one interval, they asked questions during a different interval, and they engaged in guided practice during one observation interval.

Nonproductive student actions were noted during fourteen segments of these observations. (Both kinds of student actions were observed during nine of these segments.) During fourteen segments at least one student was finished with his/her assignment and was engaged in a non math activity, which is classified as a nonproductive student action. There were two segments when students exhibited off task behavior, which was the only other nonproductive student action displayed in this class.

Algebra Special Education Interactions Between Teacher Actions and Student Actions

Whenever the Algebra Special Education teacher was engaged in an instructional action, the students displayed productive student actions. During four of these segments, they also exhibited nonproductive student actions. Students were more likely to be engaged in productive student actions when teacher actions were coded "non-instructional" (15 segments) than they were to display nonproductive student actions (10 segments).

The most frequent instructional teacher action and productive student action combination was providing individual student assistance when students were completing assignments (9 segments). Students answered questions during the segment when a teacher led a review and students asked questions when the teacher was explaining a new concept during another segment. When the teacher presented new content, the students participated in a guided practice activity (1 segment).

When we looked at the combination of non-instructional teacher actions and nonproductive student actions, we found that the most common interaction was teacher non-math activities and student non-math activities (6 segments). The two segments when students displayed off task behavior were coupled with the teacher managing behavior and managing tasks.

Algebra IA

The Algebra IA course is a general education class that progresses through beginning algebra content at a slower pace than the traditional Algebra I course. In essence, this course addresses the first half of the content that is included in Algebra I. There was only one Algebra IA class. This class was taught by the same teacher who taught all of the Algebra I classes. Twenty-nine students were enrolled in Algebra IA, with at least two students who had IEPs, one of which included a math goal. This class was taught during the last class period of the day (Period 7). This class was observed for a total of thirty observation segments, with ten segments during each observation.

Algebra IA Content

The Algebra IA class used the same book as the PreAlgebra Special Education class (Larson, Boswell, Kanold, & Stiff, 2001a). The students worked on assignments from Chapter 6 of the textbook, which focuses on solving and graphing linear inequalities, for all three of our observations. The assignment for the first observation was graphing inequalities. For the second observation, it was solving compound inequalities. During the final observation students worked on solving absolute value equations.

Algebra IA Expected Tasks

The Algebra IA classes we observed started with a rebus puzzle (called a "Plexer") to get students thinking. During the three observations between five to ten minutes was devoted to this activity. Checking homework was the next activity for two of the three classes we observed. This time included opportunities for the students to ask questions about different homework problems and to have the teacher review some or all of the steps needed to solve a particular problem. This task also took five to ten minutes. During our first observation students spent the rest of the class period completing a worksheet that the teacher scored the last five minutes of class with students lining up at the teacher's desk to get individual feedback. When we conducted our second observation the next activity was a mini lecture about inequalities, which took about five minutes. This was followed by time for students to work on that day's assignment. Once again, the students lined up at the teacher's desk to see how they had done on that day's work during the last five minutes of class. About fifteen minutes was spent showing students how to solve absolute value inequalities and having them practice this skill during our third observation. Following this instruction, students completed a short assignment at their

desks. When all the students had finished their work, the class played hangman for about ten minutes until the bell rang.

Algebra IA Teacher Actions

The Algebra IA teacher displayed instructional teacher actions during twenty-five of the thirty segments that we observed this class. The most typical instructional teacher actions we observed were actions related to teaching a lesson (11 segments), performing academic monitoring (8 segments), implementing a warm up activity (5 segments), checking homework (4 segments), asking students questions (1 segment). When we classified the teaching a lesson segments into more specific teaching actions, we found that seven of these segments were devoted to providing individual student assistance, three segments were spent modeling new skills, and one segment was used to present new content.

This teacher engaged in non-instructional teacher actions for twenty-two segments. (During seventeen of these segments both instructional and non-instructional teacher actions were observed.) The non-instructional teacher behavior that we observed most often during our observations of the Algebra IA class was behavior management. This teacher spent seventeen segments managing behavior, which often included redirecting students. The second most common non-instructional teacher behavior was doing non math activities (10 segments). The only other non-instructional teacher action was managing tasks (2 segments).

Algebra IA Student Actions

The students in this class exhibited almost equal amounts of productive and nonproductive student actions. Productive student actions occurred during twenty-seven of the thirty segments we observed. By far the most common productive student action was working on assignments (22 segments). Four segments were devoted to checking homework, and students participated in group work during four other segments. Students participated in guided practice activities for two segments, and two segments were coded as listening.

Nonproductive student actions were displayed during twenty-eight segments. (Both kinds of student actions were observed during twenty-five of these segments.) Most of the nonproductive student actions were off task behaviors. Off task behavior was noted during twenty-six observation segments. Most of the off task behavior occurred while students were working on their assignment (14 segments); however, there was some off task behavior noted during four of the segments when a warm up activity was the expected task, as well as during three of the segments when students were to be checking their homework. The other two segments with nonproductive student actions occurred when students were engaged in a non math activity (playing hangman) and two segments when a student's actions were coded "disruptive." One instance of disruptive behavior was observed during small group work and the other happened when the teacher gave the students class time to complete an assignment.

Algebra IA Interactions Between Teacher Actions and Student Actions

All of the segments with instructional teacher actions were paired with productive and nonproductive student actions. Two thirds of the segments for this class included instructional teacher actions and students working on assignments. These instructional teacher actions included eight segments when the teacher was performing academic monitoring, seven segments when the teacher was providing individual student assistance, and one segment when the teacher

modeled a skill. Nonproductive student actions were paired with providing individual student assistance (6 segments), checking homework and doing the warm up activity (4 segments each), and modeling (1 segment).

Nineteen of the twenty-two segments that included some non-instructional teacher actions were paired with productive student actions, while twenty-one of these segments were paired with nonproductive student actions. The teacher did something to manage behavior during sixteen segments when there was off task behavior, with thirteen of these combinations occurring when students were working on their assignments. Some students were off task during eight of the segments when the teacher was engaged in a non-math activity, while other students continued to work on their assignments for seven of these segments.

Algebra IB

The Algebra IB course is a general education class that progresses through algebra content at a slower pace than the traditional Algebra I course. This course addresses the second half of the content that is included in Algebra I. Algebra IB was also taught by same person who taught the Algebra I classes. Twenty-eight students were enrolled in this class. At least four of the students received special education services, and one of these students had a math goal on his or her IEP. This class met at the beginning of the day (Period 1). This class was observed for a total of twenty-five observation segments, with nine segments during the first and third observations and seven segments during the second observation.

Algebra IB Content

The Algebra IB students used the same book as the students in the Algebra IA and PreAlgebra Special Education classes. This class was working on Chapter 12, the last chapter of the book titled, Radicals and More Connections to Geometry. For the first observation the topic was rational exponents. The observation report for the second observation did not indicate the topic or page numbers for that day's topic, however, the third observation report noted that the class was studying the Pythagorean Theorem on that particular day.

Algebra IB Expected Tasks

A typical Algebra IB class started with a warm up like the other classes taught by this teacher (a "Plexer"). Next, students usually checked their homework from the previous day with the teacher answering students' questions about the previous day's work or showing how to solve a particular problem. During one of the three observations, the teacher presented new content and followed this activity with opportunities for the students to participate in some guided practice on evaluating expressions with rational exponents. During the other two observations the students went straight to work on a homework assignment or a worksheet. Students were always given at least half of the class period to work on the current assignment.

Algebra IB Teacher Actions

During the Algebra IB class, the teacher exhibited instructional teacher actions during twenty-one of the twenty-five segments that we observed. In this class the teacher displayed four different instructional actions including teaching a lesson (13 segments), conducting a warm up activity (6 segments), leading a review (3 segments), and checking homework (2 segments). A closer look at the segments coded "teaching a lesson" revealed that the teacher provided

individual student assistance for twelve segments, explained new content for one segment, and modeled a skill for one segment.

The Algebra IB teacher was engaged in non-instructional teacher behaviors for eleven segments. (Both kinds of teacher actions were evident in seven of these segments.) Non-instructional teacher actions during Algebra IB included managing behavior (7 segments), engaging in non-math activities (5 segments), and being out of the room (1 segment).

Algebra IB Student Actions

Algebra IB students exhibited productive student behaviors during twenty-three of the twenty-five observation segments for this class. These productive student actions included working on an assignment (20 segments), checking homework (2 segments), answering questions (2 segments), participating in a guided practice activity (1 segment), and taking notes (1 segment).

All of the Algebra IB segments we observed (25) included nonproductive student actions. The non productive students actions were always some form of off task behavior because there were no instances of students working on non-math activities or exhibiting disruptive behavior.

Algebra IB Interactions Between Teacher Actions and Student Actions

All segments with instructional teacher actions were paired with nonproductive student actions, specifically off task behavior. When students displayed productive student actions during segments with instructional teacher actions, the most typical combination was providing individual student assistance and working on an assignment (12 segments). Several combinations were observed during a single segment. These included leading a review and guided practice, leading a review and taking notes, leading a review and working on an assignment, as well as a segment when a student asked a question when the teacher going over the homework assignment.

During segments when the teacher engaged in non-instructional teacher actions, nonproductive student actions (off task behavior) were always present. Nevertheless, there were nine segments when students displayed productive student actions during segments with non-instructional teacher actions. For example, during four segments when the teacher was engaged in a non-math activity, some students worked on their assignments. In another segment some students continued to work on the assignment when the teacher was out of the room. While the teacher was managing behavior some students worked on their assignment (5 segments), some students participated in guided practice during one segment, and some students took notes during another segment.

Algebra I

Algebra I is the traditional beginning algebra course in this school district. We observed three Algebra I classes on four different days. (Two classes were observed on the same three days; the third class was not observed on the first of these three days, but was observed on the second and third dates, and then again two weeks later.) These classes were all taught by the same general education algebra teacher, who also taught Algebra IA and Algebra IB, and were scheduled for the middle of the school day (periods 3, 4, and 5 in a 7 period day). A total of 63

students were enrolled in Algebra I during the semester when these observations were conducted. Algebra I class sizes ranged from fourteen students to twenty-five students. Approximately 13 students with disabilities were enrolled in Algebra I classes. This course was observed for a total of seventy observation segments. Table 2 shows the number of observation segments for each observation in each class.

Table 2. Observation Segments for Algebra I

	Period 3	Period 4	Period 5
Observation 1	10 segments	6 segments	10 segments
Observation 2	10 segments	10 segments	6 segments
Observation 3	6 segments	6 segments	6 segments

Algebra I Content

For all but one of the observations, the students were working on assignments from chapter 9 in *Algebra I* published by McDougal Littel (Larson, Boswell, Kanold, & Stiff, 2001b), which addresses quadratic equations and functions. The specific topics for the observation days were working with square roots, graphing quadratic functions, and using the quadratic formula. By the time the last observation was completed, the classes had moved on to chapter 10 which covers polynomials and factoring. The specific topic for this observation was adding polynomials.

Algebra I Expected Tasks

All of the Algebra I classes began with a warm up activity called a "Plexer." This activity usually lasted between five and ten minutes. Next, came a time to check homework. The teacher used an overhead projector to display the correct answers. After students checked their own work, they usually had an opportunity to ask questions and watch the teacher work through any particularly difficult problems. This took anywhere from five to twenty-five minutes. After homework was checked, a new assignment was given, and students were allowed to work on the assignment during class time while the teacher was available to answer students' questions. During two of the nine observations of Algebra I there was a more formal presentation of new material before students started working on their assignments. For the other seven observations, new material was not presented; therefore, students went right to work on their assignment once homework was checked. On days when there was a regular schedule students had between ten to twenty-five minutes to work on their assignments during class time. On shortened days the students did not have time to work on the assignment during the class period.

Algebra I Teacher Actions

The Algebra I teacher engaged in some form of instructional activity for most of the segments we observed (66 of 70 segments). The teacher spent the most time (34 segments) checking homework as a whole class. Although we did not observe many formal presentations of new content during our observations of Algebra I classes, the next most frequent teacher action was teaching a lesson (28 segments). The third most common teacher action was conducting a warm up activity (15 segments). The next most prevalent teacher action was

academic monitoring (9 segments). The other instructional teacher action we observed was leading a review, which occurred once during our observations.

The time devoted to teaching a lesson included modeling how to solve problems while students checked their homework (12 segments) or worked on an assignment (3 segments), providing individual or small group assistance while students completed assignments (12 segments), and explaining a new algebra concept (1 segment).

Non-instructional teacher actions were observed during 18 segments (14 of these also included instructional teacher actions). The Algebra I teacher was engaged in non-math tasks or conversations for 9 segments. Seven segments included times when the teacher needed to manage student behavior. The teacher was out of the classroom for three segments, and he spent one segment managing a task (e.g., providing non-math related directions).

When we looked at the teacher's actions across the three Algebra I classes, similar patterns appeared. (See Table 3.) Checking homework was the most common instructional teacher action in two of the Algebra I classes, followed by teaching a lesson. In Period 5 checking homework and teaching a lesson were observed for the same number of segments (8), which was more than the counts for any other instructional teacher behavior during this period. For all classes, the third and fourth most common teacher actions were conducting a warm up activity and academic monitoring. Leading a review was the least common instructional teacher action, it only occurred once (only in Period 5).

Table 3: Number of Segments for Observed Teacher Actions in Algebra I

Instructional Teacher Actions	**Period 3** (26 segments)	**Period 4** (22 segments)	**Period 5** (22 segments)
Checking homework	15	11	8
Conducting a warm up activity	5	5	5
Academic monitoring	4	3	2
Leading a review	0	0	1
Teaching a lesson	11	9	8
Modeling	7	5	2
Providing individual student assistance	3	3	6
Providing an explanation	1	0	0
Non-instructional Teacher Actions			
Behavior management	2	5	0
Non math activity	0	3	6
Task management	0	1	0
Out of the room	0	0	3

During segments that were classified "teaching a lesson," we found that modeling occurred most often in Period 3 and 4, while providing individual student assistance was the

most common teacher action in Period 5. The pattern was exactly the opposite for the second most typical instructional teacher action while teaching a lesson. It was providing individual student assistance in Periods 3 and 4, and it was modeling in Period 5. Providing an explanation was the least common activity. It was noted only once during Period 3.

There were very different patterns of non-instructional teacher actions during the three Algebra I classes. In our observations of Period 3, non-instructional teacher actions were noted during only two segments. Both of these were labeled "behavior management." In Periods 4 and 5 there were nine segments that included some type of non-instructional teacher action. During the observations of Period 4 we noted behavior management during five segments, non math activities during three segments, and task management during one segment. For Period 5, there were six segments when the teacher was engaged in a non math activity and three segments when he was out of the room.

Algebra I Student Actions

All the segments in Algebra I (70) had some productive student actions noted. Students in Algebra I spent the most time working on assignments during class time (40 segments). This was followed by checking homework (32 segments). Other student actions occurred much less frequently. These included three segments when the students' main activity was listening, two segments when students were asking questions during lessons, and one segment when a student answered a question during a warm up.

The vast majority of segments also included some nonproductive student actions. Students displayed off task behavior during 50 of the 70 observation segments. There was some off task behavior during 11 of the 15 warm up segments, during 20 of the 32 checking homework segments, during 17 of the 23 segments when assignments were being completed, and during one interval when there was no assigned task. There was also one interval when student behavior was coded disruptive in addition to being off task. This occurred when students were supposed to be checking homework.

Table 4: Number of Segments for Observed Student Actions in Algebra I

Productive Student Actions	**Period 3** (26 segments)	**Period 4** (22 segments)	**Period 5** (22 segments)
Checking homework	14	10	8
Completing assignments	12	13	15
Listening	3	0	0
Asking questions	0	2	0
Answering questions	0	1	0
Nonproductive Student Actions			
Off task	22	13	15
Disruptive	1	0	0

Table 4 includes the frequencies for the student actions that were displayed in each of the Algebra I classes. The most typical productive student action in Period 3 was checking homework, and the second most common student action was completing assignments. The

rankings for these student actions were reversed for Periods 4 and 5. When we looked at nonproductive student actions, we found that much more off task behavior was displayed during Period 3 than in the other two Algebra I classes.

Algebra I Interactions Between Teacher Actions and Student Actions

When we looked at the interactions between teacher actions and student actions, we found that all of the segments that had some type of instructional teacher action also included some type of productive student action. We also found that two thirds of the segments with at least one instructional teacher action also included nonproductive student actions. Slightly more than half of the segments with instructional teacher actions occurred when students were completing assignments. The teacher most often performed academic monitoring or provided individual student assistance during the time students were completing their assignments. Almost half of the segments with instructional teacher actions occurred when students were checking their homework. "Modeling" was the most typical teacher action during these segments.

For the eighteen segments that included non-instructional teacher actions, all of them included productive student actions and about two thirds of them included nonproductive student actions. As one might guess, any time a teacher was managing behavior, some students were off task while they checked homework or worked on an assignment. When the teacher was engaged in a non-math activity, there was some form of nonproductive student behavior during seven out of nine of these segments.

Eighth Grade Algebra I

The participating teachers in District A work in a Junior-Senior High School so we were able to observe the eighth grade Algebra I class that the district offers. This course is designed for advanced students who meet certain admissions criteria (reaching a designated score on the math section of the Iowa Test of Basic Skills, as well as on an algebra aptitude test). This was the only algebra class taught by the middle school math teacher who participated in this project. This class was scheduled for the middle of the school day (period 4). On a typical day this class period was scheduled for 50 minutes with 25 minutes of class, a 24 minute lunch break, and then 25 more minutes of class time. On early dismissal days the class periods were shortened to 30 minutes and were held earlier in the day. Fifteen students were enrolled in the eighth grade Algebra I class. None of these students received special education services.

The eighth grade Algebra I class was observed for the fewest observation segments because two of the observations occurred on early dismissal days. This course was observed for a total of twenty-one segments, with five segments during the first and second observations, and eleven segments during the third observation.

Eighth Grade Algebra I Content

Two of the observations in this class coincided with the return of chapter tests (chapters 7 and 8), and the third observation took place when an assignment from chapter 9 was given. The eighth grade Algebra I class used the same textbook as the traditional Algebra I classes (Larson, Boswell, Kanold, & Stiff, 2001b). Chapter 7 deals with systems of linear equations and inequalities; chapter 8 addresses exponents and exponential functions; and, as one may

remember from the Algebra I description, chapter 9 covers quadratic equations and functions. Graphing quadratic functions was the topic during the last observation. In addition to using the textbook, this teacher used supplemental teacher-designed materials that addressed the mathematics of every day life (e.g., paying rent, buying insurance, and understanding insurance deductibles).

Eighth Grade Algebra I Expected Tasks

The first observation began with students "paying rent." This activity took about five minutes. About fifteen minutes was devoted to learning about insurance and deductibles at the beginning of our second observation. The every day life mathematics activity was followed by time to check homework during the first observation (10 minutes). When chapter tests were reviewed during the first two observations, the teacher stated the correct answer for each problem on the test and then answered students' questions or showed how to work different problems from the test. This took ten minutes during the first observation and five minutes during the second. During the second observation the last five minutes of class was spent returning student work. The third observation included very different activities. Approximately thirty minutes was devoted to the teacher introducing the steps for solving equations graphically and having students practice this skill. This instruction occurred before and after the lunch break. The last twenty minutes of class devoted to students completing an assignment while the teacher monitored their work.

Eighth Grade Algebra I Teacher Actions

Instructional teacher actions were displayed during all but one of the 21 five-minute observation segments. The most typical teacher action was teaching a lesson (13 segments), followed by checking homework (5 segments), and then by academic monitoring (3 segments). When we looked at the "teaching a lesson" segments more closely, we found that modeling occurred most frequently (7 segments). During four segments the teacher was explaining content as students asked and answered questions. The teacher provided individual student assistance during three segments.

Non-instructional teacher actions were observed during five segments (four segments were also labeled instructional). Task management was the most frequent non-instructional teacher action (3 segments). Managing behavior was next with two segments receiving this label. The teacher was engaged in a non-math activity for one segment during our observations.

Eighth Grade Algebra I Student Actions

The students in this class displayed productive student actions during every segment we observed (21). Students were engaged in guided practice activities for seven segments. They spent six segments checking homework. During four segments they worked on an assignment, and they asked questions during four other segments. We observed them answering the teacher's questions during two segments.

There were two segments when some students exhibited nonproductive student actions, specifically, off task behavior. One instance of off task behavior occurred while students were checking homework and one happened when the expected task was teacher led instruction.

Eighth Grade Algebra I Interactions Between Teacher Actions and Student Actions

As one might surmise, all of the instructional teacher actions were coupled with productive student actions in the eighth grade Algebra I class. The teacher modeled how to approach a problem, provided individual student assistance, and performed academic monitoring as students worked on guided practice activities. As students were completing assignments, the teacher actions were academic monitoring and providing individual student assistance. Students asked and answered questions while the teacher explained new content, checked homework, and modeled new skills. There was one instance when at least one student displayed off task behavior with the teacher was modeling how to solve a problem. Non-instructional teacher actions were paired with productive student actions during three segments (guided practice) and nonproductive student actions during two segments (off task behaviors).

Looking Across Classes

Content Across Beginning Algebra Courses

We observed interesting differences in the content for the six different courses. As we expected, the students in the Algebra IB class had progressed the farthest in their textbook (chapter 12). The Algebra I and eighth grade Algebra I classes were at close to the same place (chapter 9 or 10 by the last observation). The PreAlgebra Special Education class was at the same place as the Algebra IA class. The students in the Algebra Special Education class used a different text, but they were studying some of the same algebra topics as the Algebra IA and PreAlgebra Special Education students.

Expected Tasks Across Beginning Algebra Courses

It is important to point out that each algebra class was observed only three times during the last quarter of the school year. As a result, one must be cautious about making too many conclusions about these patterns. After we completed our observations, we found that there were at least four expected tasks for each course. (See Table 5 for frequencies and percentages for the expected tasks in each course.) The eighth grade Algebra I class and the PreAlgebra Special Education class both had four expected tasks. Five expected tasks were observed in the Algebra I classes, the Algebra Special Education class, and Algebra IA class. All of the possible expected tasks occurred in the Algebra IB class.

The most prevalent expected task across the beginning algebra courses in District A was an assignment for four out of the six courses. It is interesting to note that working on assignments took up the most time in both of the special education algebra classes, Algebra IA, and Algebra IB because these classes have students who were more likely to struggle as they learn algebra. Checking homework took the most time in Algebra I, while teacher led instruction was the most common expected task in the eighth grade Algebra I class. No other patterns among the rankings of the expected tasks across the courses were found, even when we dropped warm up activities because these were only used by one teacher who taught three different courses.

When we looked at the percentage of time spent on different expected tasks, there was considerable variability across the beginning algebra courses. As we noted earlier, an assignment was the most typical expected task. This was the expected task for at least half of the segments in PreAlgebra Special Education (61%), Algebra IB (60%), and Algebra IA (50%). In

the Algebra Special Education class, an assignment was the expected task for 46% of the segments. In the Algebra I classes, an assignment was the second most common expected task, and it was noted during 33% of the observation segments for this course. The expected task was an assignment for only 19% of the segments in eighth grade Algebra I.

Table 5: Expected Tasks Across Beginning Algebra Courses in District A

Expected Task	PreAlgebra SE (23 segments)		Algebra SE (28 segments)		Algebra IA (30 segments)		Algebra IB (25 segments)		Algebra I (70 segments)		8th Grade Algebra I (21 segments)	
	#	%	#	%	#	%	#	%	#	%	#	%
Assignment	14	61%	13	46%	15	50%	15	60%	23	33%	4	19%
Review	9	39%	1	4%	0	0%	2	8%	0	0%	0	0%
Teacher Led Instruction	0	0%	2	7%	4	13%	1	4%	5	7%	11	52%
Checking Homework	3	13%	0	0%	3	10%	2	8%	32	48%	6	29%
Warm up	0	0%	0	0%	5	17%	6	24%	17	24%	0	0%
Non-math task	0	0%	8	29%	3	10%	5	20%	0	0%	0	0%
No assigned task	1	4%	5	18%	5	17%	1	4%	2	3%	1	5%

Three courses had a review as one of the expected tasks during our observations. This task was used most often in the PreAlgebra Special class. A review occurred during 39% of the segments in this class. We also observed reviews in Algebra IB (8%) and Algebra Special Education (4%).

Teacher led instruction was noted as an expected task in five of the six courses. This task was observed during 52% of the eighth grade Algebra I segments, 13% of the Algebra IA segments, 7% of the Algebra I and Algebra Special Education segments, and 4% of the Algebra IB segments.

In every course except the Algebra Special Education class, checking homework was an expected task. This task was observed most often in the Algebra I classes (48%). Checking homework took up 29% of the time we observed in the eighth grade Algebra I class. Much less time was spent checking homework in the PreAlgebra Special Education class (13%), Algebra IA class (10%), and the Algebra I B class (8%).

Only one of the teachers used a warm up activity as one of the expected tasks in his courses. In the Algebra I classes and the Algebra IB class, 24% of the observation segments included a warm up activity. Seventeen percent of the time was devoted to this task in the Algebra IA class.

Non-math tasks were noted in three of the courses. Twenty-nine percent of the segments included non-math activities in the Algebra Special Education class, while 20% of the time in

Algebra IB was devoted to non-math tasks, and 10% of the segments in Algebra IA had some non-math activity noted.

All of the courses had some time periods when there was no assigned task. These segments were often at the beginning or end of our observations. The Algebra Special Education and the Algebra IA classes had the highest percentage of time with no assigned task (18% and 17%, respectively). Five percent of the segments in the eighth grade Algebra I class had no assigned task, and the percentage for the PreAlgebra Special Education and Algebra IB classes was 4%. There was no assigned task in 3% of the Algebra I observation segments.

Teacher Actions Across Beginning Algebra Courses

As we examined the data for teacher actions across beginning algebra courses in District A, we began our analysis with the highest level in our hierarchical coding scheme, that of instructional and non-instructional teacher actions. When we did this, we found many segments when both codes appeared; therefore, we thought it would be enlightening to see the percentages of segments that only included instructional teacher action codes, that only included non-instructional teacher codes, and that had both types of codes in each course. The results of this analysis appear in Table 6.

Table 6: Teacher Actions Across Beginning Algebra Classes in District A

Course	Instructional		Non-instructional		Both		Total*	
	Segments	%	Segments	%	Segments	%	Segments	%
PreAlgebra Special Education	16	70%	2	9%	5	22%	23	101%
Algebra Special Education	9	32%	13	46%	6	22%	28	100%
Algebra IA	8	27%	5	17%	17	57%	30	101%
Algebra IB	14	56%	4	16%	7	28%	25	100%
Algebra I	52	74%	4	6%	14	20%	70	100%
8th Grade Algebra I	16	76%	1	5%	4	19%	21	100%

*NOTE: Due to rounding, some totals may exceed 100%.

When we organized our findings about teacher actions in this way, we found similar patterns in eighth grade Algebra I, Algebra I, and PreAlgebra Special Education. Each of these courses had only instructional teacher actions noted in at least 70% of their observation segments. The percentage of segments with only non-instructional teacher actions was very low for each of these courses (9% or less). In addition, these three courses had the lowest percentages of segments when both categories of teacher actions were identified (22% or less).

Eighth Grade Algebra I was the course with the greatest percentage of instructional only segments (76%). This class also had the lowest percentage of non-instructional only segments (5%) and the lowest percentage of segments with both types of teacher actions (19%). The Algebra I course had the second highest percentage of instructional only segments (74%) and the

second lowest percentage of non-instructional only segments (6%). It also had the second lowest percentage of segments with both categories of teacher actions (20%). The PreAlgebra Special Education course had the third highest percentage of instructional only segments (70%), as well as the third lowest percentage of segments with non-instructional teacher actions (9%) and segments with both categories of teacher actions (22%, which was the same percentage as Algebra Special Education).

The other three beginning algebra courses in District A had much lower percentages of segments with only instructional teacher actions. Fifty-six percent of the Algebra IB segments were labeled "instructional", while this was the case for 32% of the Algebra Special Education segments and only 27% of the Algebra IA segments.

Algebra Special Education was the course with the greatest percentage of segments with non-instructional teacher actions (46%). The percentages for Algebra IA and IB (17% and 16%, respectively) were not nearly as high as the Algebra Special Education course; however, these percentages were still much higher than the percentages for the eighth grade Algebra I, Algebra I, and PreAlgebra Special Education courses.

The Algebra IA course had the highest percentage of segments where both instructional and non-instructional actions were observed (57%). The percentage for the Algebra IB class was 28%, which is about half of the percentage for Algebra IA, while the percentage for the Algebra Special Education class was the same as that for the PreAlgebra Special Education class (22%).

As we examined the next level of codes related to teacher actions, we focused on specific teacher actions within the categories of instructional and non-instructional teacher actions. Our findings are presented in Table 7. When conducting this analysis we looked all the segments with instructional teacher action codes and all the segments with non-instructional teacher action codes; we did not separate the segments into the mutually exclusive categories of only instructional, only non-instructional, and both as we did for the data in Table 6.

When we considered all the segments with instructional teacher actions, we found that more than half of all the observation segments in all six courses included instructional teacher actions. (See Table 7 for frequencies and percentages for teacher actions across the six beginning algebra courses.) In three of the courses, more than 90% of the segments include some type of instructional teacher behavior (Algebra I – 94%, eighth grade Algebra I – 95%, and PreAlgebra Special Education – 91%). The percentage of instructional teacher actions in Algebra IA and IB was 83% and 84%, respectively. The Algebra Special Education class had the lowest percentage of instructional teacher actions (54%).

Of the five instructional teacher actions observed in District A, teaching a lesson was the most typical teacher behavior in five of the six classes. This category included presenting new content, modeling during a review or checking homework, providing individual student assistance, providing explanations, and asking questions. "Teaching a lesson" behaviors were observed most often in the eighth grade Algebra I class (62%). Such behaviors occurred next most frequently in the Algebra IB class (52%). Actions related to teaching a lesson were observed during 43% of the segments in the PreAlgebra Special Education class, during 37% of the segments in the Algebra IA class, and during 36% of the Algebra Special Education

segments. Although teaching a lesson was the second most typical instructional teacher action in the Algebra I classes, the percentage for this behavior (40%) was still greater than the percentage for the Algebra IA and IB classes.

Table 7: Specific Teacher Actions Across Beginning Algebra Courses in District A

	PreAlgebra SE (23 segments)		Algebra SE (28 segments)		Algebra IA (30 segments)		Algebra IB (25 segments)		Algebra I (70 segments)		8th Grade (21 segments)	
	#	%	#	%	#	%	#	%	#	%	#	%
Instructional Teacher Actions	21	91%	15	54%	25	83%	21	84%	66	94%	20	95%
Checking homework	0	0%	2	7%	4	13%	2	8%	34	49%	5	24%
Conducting a warm up activity	0	0%	0	0%	5	17%	6	24%	15	21%	0	0%
Academic monitoring	4	17%	2	7%	8	27%	0	0%	9	13%	3	14%
Leading a review	8	35%	1	4%	0	0%	3	12%	0	0%	0	0%
Teaching a lesson	10	43%	10	36%	11	37%	13	52%	28	40%	13	62%
Modeling	3	13%	0	0%	3	10%	1	4%	14	20%	7	33%
Providing individual student assistance	7	30%	9	32%	7	23%	12	48%	12	17%	3	14%
Providing an explanation	0	0%	1	4%	0	0%	1	4%	1	1%	4	19%
Asking questions	0	0%	0	0%	1	3%	0	0%	0	0%	0	0%
Non-instructional Teacher Actions	7	30%	19	68%	22	73%	11	44%	18	26%	5	24%
Task management	0	0%	9	32%	2	7%	0	0%	1	1%	3	14%
Behavior management	3	13%	3	11%	17	57%	7	28%	7	10%	2	10%
Non math activity	5	22%	9	32%	10	33%	5	20%	9	13%	1	5%
Out of room	0	0%	1	4%	0	0%	1	4%	3	4%	0	0%

Our hierarchical coding system included additional codes for instructional teacher actions that were first classified as "teaching a lesson." When we looked at this level of detail, we found that all of the courses had segments when the teacher provided individual student assistance, five of the six courses included times when the teacher modeled how to work through a problem (Algebra Special Education was the exception), the teacher provided an explanation in four of

the courses (Algebra I, eighth grade Algebra I, Algebra Special Education, and Algebra IB), and the teacher asked questions in one class (Algebra IA).

When we looked at these subcategories, we found that the most prevalent "teaching a lesson" behavior was modeling in the Algebra I and eighth grade Algebra I classes (20% and 33% of all segments, respectively). In the remaining classes, the most typical "teaching a lesson" action was providing individual assistance. This action was observed in 48% of the Algebra IB segments, during 32% of the Algebra Special Education segments, for 30% of the PreAlgebra Special Education segments, and in 23% of the Algebra IB segments.

In the Algebra I classes, the second most common "teaching a lesson" behavior was providing individual student assistance (17% of all segments). For the eighth grade Algebra I and the Algebra Special Education classes, the "teaching a lesson" action that received the second highest percentage was providing an explanation (19% and 4%, respectively). Modeling was the second most common "teaching a lesson" action in the PreAlgebra Special Education class (13%), in Algebra IA (10%), and in Algebra IB (4%). (Providing an explanation was also observed during 4% of the Algebra IB segments.)

The third most typical "teaching a lesson" action was providing individual student assistance in eighth grade Algebra I (14%), asking questions in Algebra IA (3%), and providing an explanation in Algebra I (1%).

Moving back to the level of instructional teacher actions, we found checking homework with the class or at the teacher's desk to be the most common instructional teacher action in the Algebra I classes (49%), while it was the second most prevalent instructional teacher behavior in the eighth grade Algebra I class (24%) and the Algebra Special Education class (7%). Checking homework was the fourth most common instructional teacher action in Algebra IA (13%) and Algebra IB (8%). There were no segments where the teacher action was coded checking homework in the PreAlgebra Special Education class. (This finding surprised us because the expected task was checking homework for 13% of the segments in the PreAlgebra Special Education class. When we checked the record in Qualrus, we found that a student was checking his or her own work during these segments.)

As we indicated earlier, only one teacher used a warm up activity in his classes. The percentages for this activity matched those in the expected task for Algebra IA and Algebra IB. In the Algebra I class, the percentage for conducting a warm up activity was slightly lower (21% as compared to 24%). This decrease resulted from a segment when the teacher was temporarily out of the room during a warm up activity.

Academic monitoring was the second most common instructional teacher action in the Algebra Special Education class (7%, the same percentage as checking homework) and Algebra IA. This behavior was the third most typical instructional teacher action in the eighth grade Algebra I class (14%) and the PreAlgebra Special Education class (17%). In the Algebra I classes, this instructional teacher action ranked fourth at 13%. There was no academic monitoring observed in the Algebra IB class.

The last instructional teacher action we coded was leading a review. Only three classes had reviews during our observations. The PreAlgebra Special Education teacher spent the most time reviewing (35%), while this behavior was observed in 12% of the Algebra IB segments and during 4% of the Algebra Special Education segments.

Next, we considered non-instructional teacher actions. The eighth grade Algebra I class had the lowest percentage of segments with non-instructional teacher actions (24%). The Algebra I classes were a close second at 26%. The classes with the most non-instructional teacher actions were Algebra IA (73%) andAlgebra Special Education (68%) and. The PreAlgebra Special Education class and the Algebra IB classes were in the middle with 30% and 44%, respectively.

Non-math teacher activity was observed in all six courses. It was the most common non-instructional teacher action for three of the beginning algebra classes. Thirty-two percent of the observation segments in Algebra Special Education included some non math teacher activity. (The same percentage of intervals was devoted to task management in this class.) Non-math teacher activities were noted during 22% of the PreAlgebra Special Education segments and in 13% of the Algebra I segments. Non-math teacher actions were the second most typical non-instructional teacher actions in the Algebra IA and Algebra IB classes (33% and 20%, respectively). Such actions were the third most prevalent non-instructional teacher behavior in the eighth grade Algebra I class (5%).

Every beginning algebra course also included non-instructional teacher actions labeled "behavior management." This was the most typical non-instructional teacher action in the Algebra IA and Algebra IB classes. Behavior management was observed during 57% of the Algebra IA segments and in 28% of the Algebra IB segments. This teacher action was the second most common non-instructional teacher behavior in three classes. Thirteen percent of the segments in PreAlgebra Special Education included teacher actions related to behavior management, and 10% of the segments in Algebra I and eighth grade Algebra I had such teacher actions. This was the third most common non-instructional teacher behavior in the Algebra Special Education class (11%).

Task management was observed in four of the beginning algebra courses. This was tied as the most common non-instructional teacher action in Algebra Special Education (32%). It was the most prevalent non-instructional teacher action in eighth grade Algebra I (14%). Task management was noted in 7% of the Algebra IA observation segments and 1% of the Algebra I segments.

The last non-instructional teacher action that we observed during our observations was labeled "out of the room." This behavior was observed in three courses. This happened one time during Algebra IB and Algebra Special Education (4%), and three times during Algebra I (4%).

Student Actions Across Beginning Algebra Courses

Our examination of the student action data across the beginning algebra classes in District A began with a look at segments with only productive student actions, segments with only nonproductive student actions, and segments that had both codes. The frequencies and percentages for these three categories of student actions appear in Table 8.

The students in the eighth grade Algebra I and PreAlgebra Special Education courses showed similar behavior patterns with at least 87% of the segments only coded "productive student behavior," no segments only coded "nonproductive student behavior," and thirteen percent or fewer segments receiving both codes. The eighth grade Algebra I class had the highest percentage of segments only labeled "productive" (90%). The PreAlgebra Special Education class had the second highest percentage at 87%. There were three courses with no segments that were only labeled "nonproductive" – eighth grade Algebra I, PreAlgebra Special Education, and Algebra I. When we looked at segments with both codes for student actions, we found that the eighth grade Algebra I class had the fewest segments with both codes (10%) and the PreAlgebra Special Education class had the second fewest segments with both codes (13%).

Table 8: Student Actions Across Beginning Algebra Classes in District A

Course	Productive		Nonproductive		Both		Total	
	#	%	#	%	#	%	#	%
PreAlgebra Special Education	20	87%	0	0%	3	13%	23	100%
Algebra Special Education	14	50%	5	18%	9	32%	28	100%
Algebra IA	2	7%	3	10%	25	83%	30	100%
Algebra IB	0	0%	2	8%	23	92%	25	100%
Algebra I	20	29%	0	0%	50	71%	70	100%
8th Grade Algebra I	19	90%	0	0%	2	10%	21	100%

The course with the third highest percentage of segments only coded "productive student behavior" was the Algebra Special Education course (50%). This course also had the third highest percentage of segments with both codes (32%). On the other hand, we found that this class had the highest percentage of time when students were engaged in activities that did not lead to increased understanding of algebra (18%).

The Algebra I, Algebra IA, and Algebra IB courses all had much greater percentages of segments where both codes for student actions were assigned. Algebra IB had the highest percentage of segments with both codes (92%). The percentage for Algebra IA was 83% and for Algebra I, it was 71%. Of these three courses, the percentage for segments with only productive student actions was the greatest for the Algebra I course (29%). The Algebra IA percentage was 7%, and there were no segments with only productive student actions in Algebra IB. As we noted earlier, Algebra I had no segments when only nonproductive student actions were noted, whereas only nonproductive student actions were noted in 8% of the Algebra IB observation segments, and 10% of the Algebra IA segments.

Table 9 includes the data for our findings regarding specific student actions within the general categories of productive student actions and nonproductive student actions. When we looked at specific student actions, we only used the categories "productive student actions" and "nonproductive student actions" as we did with teacher actions. In other words, these categories were not mutually exclusive in this analysis because many of the segments had both codes. As

we pointed out before, there were three classes that had no segments with only nonproductive student actions; consequently, we observed productive student behaviors during all of the five-minute segments in Algebra I, eighth grade Algebra I, and PreAlgebra Special Education. In the Algebra IB class, productive student actions were noted during 92% of the observation segments. For the Algebra IA class, the percentage was 90%, and in the Algebra Special Education class, productive student actions were observed during 82% of the segments.

There were five different types of productive student actions in each beginning algebra class. (See Table 9 for a table with the frequencies and percentages for student actions.) When we looked at the rankings for the different student actions, we found the most common productive student action across the classes was completing assignments. The only exception was the eighth grade Algebra I class, where participating in guided practice activities was the most typical behavior, and completing assignments was the third most prevalent productive student behavior. Checking homework was the second most common productive student action for all the classes, except the PreAlgebra Special Education class where participating in guided practice activities was the second most typical. In the Algebra Special Education class participating in guided practice activities was tied with checking homework, as was asking and answering questions. In the Algebra IA class participating in group work had the same percentage as checking homework.

Although there was some agreement in the rankings of the most common productive student actions, there were no two courses with more than two rankings that were the same. This was true even when the same teacher taught three different courses. Even when there was agreement in the rankings, the percentages for each kind of productive student action were quite different. For example, even though completing assignments was the most typical productive student action in five of the beginning algebra courses, the percentages of time spent in this way ranged from 57 to 80 % (Algebra I – 57%, PreAlgebra Special Education – 61%, Algebra Special Education – 71%, Algebra IA – 73%, and Algebra IB – 80%). The remaining class, eighth grade Algebra I, worked on assignments for 19% of the observation segments.

The same situation occurred with regard to checking homework, the second most typical productive student action for most courses. Algebra I students spent 46% of the observation segments checking homework, while the percentage was 29% for eighth grade Algebra I, 13% for Algebra IA, 8% for Algebra IB, and 4% for Algebra Special Education. The PreAlgebra Special Education students spent the same amount of time as those in Algebra IA (13%); however, as we noted earlier this was the third most typical productive student action for this class.

Students asked questions in five of the beginning algebra classes during our observations. This happened most frequently in the eighth grade Algebra I class (4 segments, 19%). Students asked questions during two of the segments when Algebra I classes were observed, and during one segment in Algebra Special Education, PreAlgebra Special Education, and Algebra IB.

The courses where participating in guided practice activities occurred during more than one fourth of the observation segments were the eighth grade Algebra I class (33%) and the PreAlgebra Special Education class (26%). This action was also noted in Algebra IA (7%), Algebra IB (4%), and Algebra Special Education (4%).

Table 9: Specific Student Actions Across Beginning Algebra Courses in District A

	PreAlgebra SE (23 segments)		Algebra SE (28 segments)		Algebra IA (30 segments)		Algebra IB (25 segments)		Algebra I (70 segments)		8th Grade Algebra I (21 segments)	
	#	%	#	%	#	%	#	%	#	%	#	%
Productive Student Actions	23	100%	23	82%	27	90%	23	92%	70	100 %	21	100 %
Checking homework	3	13%	1	4%	4	13%	2	8%	32	46%	6	29%
Completing assignments	14	61%	20	71%	22	73%	20	80%	40	57%	4	19%
Participating in guided practice activities	6	26%	1	4%	2	7%	1	4%	0	0%	7	33%
Participating in group work	0	0%	0	0%	4	13%	0	0%	0	0%	0	0%
Listening	3	13%	0	0%	2	7%	0	0%	3	4%	0	0%
Taking notes	0	0%	0	0%	0	0%	1	4%	0	0%	0	0%
Asking questions	1	4%	1	4%	0	0%	1	4%	2	3%	4	19%
Answering questions	0	0%	1	4%	0	0%	0	0%	1	1%	2	10%
Nonproductive Student Actions	3	13%	14	50%	28	93%	25	100 %	50	71%	2	10%
Non-math activities	0	0%	14	50%	2	7%	0	0%	0	0%	0	0%
Off task	3	13%	2	7%	26	87%	25	100 %	50	71%	2	10%
Disruptive	0	0%	0	0%	2	7%	0	0%	1	1%	0	0%

Observers noted that students were listening while observing three different courses – Algebra I (3 segments), PreAlgebra Special Education (3 segments), and Algebra IA (2 segments). Answering teachers' questions also occurred in three courses. This happened during two segments in eighth grade Algebra I, and during one segment of Algebra I, as well as one segment of Algebra Special Education.

Algebra IA was the only class where the students participated in group work (4 segments). The only class where observers included information about students taking notes was Algebra IB (1 segment).

When we examined the observation data related to nonproductive student actions, we found a very large range of percentages. In the eighth grade Algebra I class, nonproductive student actions were displayed during 10% of the segments, while such behaviors were noted during 100% of the Algebra IB segments. Nonproductive student actions were noted during

71% of the Algebra I segments, during 93% of the Algebra IA segments, during 50% of the Algebra Special Education segments, and 13% of the PreAlgebra Special Education segments.

The most common nonproductive student actions were off task behaviors for five of the six courses. Off task behaviors accounted for all the nonproductive student actions in eighth grade Algebra I, PreAlgebra Special Education, and Algebra IB. In Algebra I, all of the segments with nonproductive student actions included off task behavior, and there was one segment when disruptive behavior was also observed. In the Algebra IA class, some students engaged in off task behavior during 87% of the observation segments. The remainder of the nonproductive student actions in Algebra IA came from the two segments when students were engaged in non-math activities, and the two segments when a student was disruptive.

The most common nonproductive student actions in the Algebra Special Education class were non-math activities such as working on assignments for other classes or reading the newspaper. All of the nonproductive segments (14) had non-math activities, and two of these segments also had some off task behavior.

Discussion

As we pointed out at the beginning of this report, this study was designed to answer four research questions:

1) How similar is the algebra curriculum for students with and without disabilities?
2) How are beginning algebra class periods structured?
3) What kinds of instructional approaches are used to help students learn algebra in general and special education?
4) How do students with and without disabilities respond to these instructional approaches?

We address each of these questions in this section of the report, beginning with the curriculum in the beginning algebra courses in District A.

When we looked at the algebra curriculum for students with and without disabilities, we did not find many differences. There were special education students in all of the general education algebra courses except for eighth grade Algebra I, which only had advanced students. Special education students in these courses used the same materials and did the same assignments as their general education peers. The eighth grade Algebra I and Algebra I classes used the same textbook and were studying similar topics during our observations. The students in the PreAlgebra Special Education, Algebra IA, and Algebra IB classes used a different textbook than the eighth grade Algebra I and the Algebra I students; however, their book was published by the same company. This text addresses the same topics in each chapter using simpler language in the explanations and more “checkpoints” or opportunities for guided practice in each lesson. The students in the PreAlgebra Special Education class were working on assignments from the same chapter as the Algebra IA class when we made our observations, which surprised us because the PreAlgebra Special Education class is a prerequisite for the Algebra Special Education course which is supposed to be equivalent to Algebra IA. The

students in the Algebra Special Education class used a different textbook by a different publisher and were only learning some of the same algebra topics as their Algebra IA and PreAlgebra Special Education peers. (This district no longer has separate special education and general education algebra courses. Now, courses that are equivalent to Algebra IA and Algebra IB are co taught by a general education math teacher and a special education teacher.)

The structure of class periods in beginning algebra courses in District A corresponds most directly with the expected tasks that were identified in the course of this study. After examining the expected task data for individual courses, as well as across the beginning algebra courses, we found that who was teaching the class had more influence on the class structure than the level of the course or percentage of students with disabilities. One teacher taught the Algebra IA class, Algebra IB class, and all of the Algebra I classes; therefore, the structure for the Algebra IA, Algebra IB, and Algebra I classes was very similar with a warm up, time to check for homework, a short lesson or review (some of the time), and then time to work on an assignment. Different teachers taught the remaining three beginning algebra courses in this district. The structures in these classes varied from one observation to the next. In the PreAlgebra Special Education class, the teacher spent more time reviewing algebra concepts and engaging the students in guided practice activities than the Algebra Special Education teacher did. The Algebra Special Education teacher gave much shorter assignments, which meant that students often had more time to work on assignments for other classes or engage in quiet "free time" activities. The eighth grade Algebra I teacher gave students much less time to work on their assignments in class than the other beginning algebra teachers and engaged in the most teacher-led instruction.

On the whole, we found that the algebra teachers in District A used fairly traditional instructional approaches during the class periods that we observed. Most often the class periods included time to check homework and work on an assignment. What surprised us was the limited amount of time devoted to teacher-directed group instruction during our observations. Such instruction was most evident in the eighth grade Algebra I course which was designed for high ability students. In addition, explanations of algebraic concepts occurred during a greater percentage of the observation intervals in this class than in any of the other beginning algebra courses in District A. Teachers modeled how to solve different kinds of algebra problems in front of the whole class much more often in the eighth grade Algebra class and in Algebra I than in the special education algebra classes and the slower-paced Algebra IA and IB classes, where we found that providing individual student assistance was the primary means for teaching algebra skills to students who were more likely to struggle to learn this content.

Working on assignments during class time was the primary vehicle for enhancing students' understanding of algebraic skills and concepts for all of the courses except for the eighth grade Algebra class. Instead, the high ability students in this algebra class participated in guided practice activities and question and answer sessions to develop their understanding of beginning algebra. Students did what was expected of them in PreAlgebra Special Education, Algebra Special Education, and in eighth grade Algebra I. Off task behavior occurred much more frequently in Algebra I, Algebra IA, and Algebra IB. Without examining student achievement data, which was not part of this study, it is difficult to say which approaches were most effective for students with and without disabilities.

Student achievement data will be reviewed as a part of the next phase of this study, which will be the creation of a case study of beginning algebra curriculum and instruction in District A. This case study will be based on the findings from this report, the data from Technical Report #1 (Olson, Foegen, & Lind, 2006), as well as interviews with district personnel and district documents.

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Appendix A

Project AAIMS Anecdotal Recording Form

Teacher _____ Period ____ Date _____ IEP LA

Project AAIMS Anecdotal Recording Form

Observer instructions: As you observe the classroom you will need to focus on the academic content, the teacher's actions, the student's actions, and the classroom activity. Your anecdotal notes should focus on what type of activity is occurring in the classroom (direct instruction, cooperative groups, etc.) as well as the actions of both the students and the teacher. **Please be very specific in your recording of your anecdotal notes**	
Five-minute interval	**Anecdotal notes**

Appendix B

Anecdotal Observation Coding Handbook

Project AAIMS
Anecdotal Observation Coding Handbook

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May 2005

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Project AAIMS
Anecdotal Observation Coding Handbook
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Code Generation

Codes for Project AAIMS anecdotal observations were developed through an iterative process that began with principal investigator, the project coordinator, and a research assistant meeting to discuss possible codes for the data we had collected. During this meeting we brainstormed some potential codes for each of three categories of interest including: expected task, teacher actions, and student actions. We also decided to also note the particular algebra topic or topics that were addressed during an observation. With this preliminary list of codes in hand, each member of our research team independently examined the same set of two observation reports to verify that the codes we had brainstormed would work for the data we had collected. We wanted to ensure that our codes would be applicable for both general education and special education classes so we selected one observation report from a general education class and the another from a special education class. At our next meeting we discussed new codes we decided were necessary and changed some of our initial codes. In addition, we discussed specific segments where we disagreed about code assignments, which helped us refine the definitions for each of the individual codes. We determined that we could use more than one code for each category of interest for each five-minute interval because it was not possible for the coder to determine the most prevalent behavior during an interval from the observation reports that were completed by different observers. After three rounds of code refinement using different sets of observations, the team concluded that we had sufficient agreement (95%) to begin the final round of coding. The research assistant recoded all of the previous observations with the finalized list of codes. This work was spot checked by the project coordinator.

Coding begins by noting the content being addressed during the class period that was observed. Next, the researcher considers the expected task, the teacher's actions, and the students' actions for each five-minute observation segment.

Expected Tasks

The first step is to identify the expected task for the observation interval. Identify the type of activity or activities the teacher expects to occur during a particular five-minute interval. There are eight possible expected tasks. These include warm up activities, teacher led instruction, checking homework, reviewing, working on an assignment, participating in group work, or no assigned task. Code all the expected tasks that are evident from the observation notes. If available, be sure to note the source of an assignment such as textbook or worksheet.

Expected Task Codes:

- warm ups (**E-WU**)
- teacher led instruction (**E-TLI**)
- checking homework (**E-CH**)
- assignment (**E-A**)
- review (**E-R**)
- test/quiz (**E-TQ**)
- non-math (**E-NM**)
- no assigned task (**E-NAT**)

Teachers' Actions

As you examine each observation interval decide if the noted teacher actions are instructional or non-instructional. In other words, do the actions promote algebra learning or not? Once you have decided if a teacher action is instructional or non-instructional, note this code. Then, determine what category of instructional or non-instructional actions is being demonstrated and record the appropriate code.

Instructional activities include conducting warm-ups, checking homework, academic monitoring, administering a test or quiz, leading a review, or teaching a lesson. If the teacher is teaching a lesson, list an additional code such as questioning, modeling, or explaining content if these can be distinguished. Providing individual or group assistance is also considered "teaching a lesson."

Non-instructional teacher actions are subdivided into task management (general non-instructional classroom tasks), behavior management, being out of the room, or non-math content.

Teacher's Action Codes:

<u>Instructional</u>
- conducting warm-ups (**T-WU)**
- checking homework (**T-CH**)
- academic monitoring (**T-AM**)
- administering a test/quiz (**T-TQ**)
- leading a review (**T-LR**)
- teaching a lesson (**T-TL**)
    - questioning (**T-Q**)
    - modeling (**T-M**)
    - explaining content (**T-E**)
    - providing individual/ small group assistance (**T-ISA**)

<u>Non-Instructional</u>
- task management (**T-TM**)
- behavior management (**T-BM**)
- out of the room (**T-OR**)
- non-math content (**T-NM**)

Students' Actions

The students' actions are first classified as productive or nonproductive behaviors and then further subdivided just as the teacher's actions were. Productive student actions include: guided practice, verbally answering questions, asking questions, seatwork (working on an assignment), group work, checking homework, or listening (use only when this seems to be the predominant student activity during a five-minute interval). Nonproductive student actions can be subdivided into disruptive, off task, or non-math. As with the other categories, more than one label can be used during an observation segment.

Students' Action Codes:

Productive	vs.	Nonproductive
- guided practice (**S-GP**)		- disruptive (**S-D**)
- verbally answering questions (**S-VQ**)		- off task (**S-OFF**)
- asking questions (**S-AQ**)		- on task non-math (**S-NM**)
- seatwork (**S-S**)		
- taking a test/quiz (**S-TQ**)		
- checking homework (**S-CH**)		
- group work (**S-GW**)		
- listening (**S-L**)		
- taking notes (**S-TN**)		

Glossary

Expected Tasks

E-A (assignment) – homework or class work given to the students by the teacher to complete.

E-CH (checking homework) - correcting a completed assignment.

E-NAT (no assigned task) – students are not given an expected task.

E-NM (non-math) – a non-algebra related task is assigned such as a game or reading the newspaper when an assignment is finished.

E-R (review) – students are going over previously learned or corrected material.

E-TLI (teacher led instruction) – teacher is teaching a lesson.

E-TQ (test/quiz) – students are taking a test or quiz.

E-WU (warm ups) – students are solving puzzles to prepare their minds for a lesson.

Teacher Actions

T-AM (academic monitoring) - teacher is walking around the room answering students' questions, listening to their responses, and/or watching as they complete their work.

T-BM (behavior management) - teacher's actions designed to maintain classroom order by redirecting extinguishing negative behavior or .

T-CH (correcting homework) – teacher is helping students check homework as a class or grading individual student papers.

T-E (explaining content) - teacher's verbal explanation of material during a lesson.

T-ISA (individual/ small group assistance) - teacher is providing personal instruction to an individual or portion of the class.

T-LR (leading a review) – teacher is reviewing previously covered or corrected material.

T-TM (task management) - teacher performs activities that are non-instructional yet related to learning math such as preparing for a lesson, passing out papers, or cleaning up materials.

T-M (modeling) - teacher demonstrates how to solve particular problems or concepts during a lesson.

T-NM (non-math content) – teacher is involved in non-math related ideas or activities such as discussing the day's current events, facilitating a non-math game, attending to mechanical errors, or speaking with visitors at the door or on the phone.

T-OR (out of the room) – teacher is not in the classroom.

T-Q (questioning) – type of teaching strategy in which the teacher asks students questions during a lesson to assess their understanding of the material.

T-TL (teaching a lesson) – teacher is presenting a math related lesson.

T-TQ (administer test/quiz) – teacher is explaining a test or quiz for students to complete during class.

T-WU (conducting warm-ups) – teacher is discussing or correcting warm-up activities.

Student Actions

S-AQ (asking questions) – students are asking the teacher math related questions during a lesson.

S-CH (checking homework) – students are correcting assignments

S-D (disruptive) - any out of control behavior, such as throwing objects, fighting, or yelling by a student, that interrupts another student from the assigned task.

S-GP (guided practice) – students solve problems during a lesson with feedback and direction from the teacher during a lesson either at their seats or on the boards.

S-GW (group work) – students are on task working with other peers to complete the expected task.

S-L (listening) – the students are attentive to instruction. Use this only if no other on-task student behavior is specified.

S-NM (on task non-math) – students are performing an expected task that is not math related without distracting others. These tasks include waiting quietly for class to begin, working on other subjects if allowed to do so, or playing an approved non-algebraic game.

S-OFF (off task) – students are not participating in the expected task.

S-S (seatwork) – students are working at their desk on an assignment, warm up, or other assigned task.

S-TN (taking notes) – students are taking notes

S-TQ (taking a test/quiz) – students are taking a test or quiz.

S-VQ (verbally answering questions) – students are responding to math related questions or verbally interact with the teacher during a lesson.