Parental Involvement with Homework and Third Grade Student Achievement

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Parental Involvement with Homework and
Third Grade Student Achievement

by
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Third Grade Student Achievement
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Chapter I: Introduction

Introduction

Since the first day of the very first built school house, teachers have been assigning their students homework. While there are good reasons for these assignments- to build responsibility, encourage practice and to be better prepared- the fact remains that parents, and their involvement with their child, is critical to promoting academic success.

Parents and teachers working together on homework assignments could raise levels of student achievement and motivation. According to Shumow and Miller (2001), parental involvement in education at home and school is positively related to young adolescent’s academic success. When parents know what their child is learning about in school they can be more involved in their education by asking them questions and pointing out examples of how a certain topic relates to the real world. For example, math comes up everywhere- grocery stores, television game shows, music notes, garage sales, restaurants, etc.

In addition to parents knowing what their child is learning in school it is important for them to know how to bridge the gap from school to home to make the students’ learning more meaningful. Teachers could provide examples of ways parents can help to increase achievement of students. Epstein and Jansorn (2004) stated that student achievement and attitudes improved when teachers communicated with parents about specific ways they could help their child learn at home.
Lamberts (1997) suggests that parents can help point out to their children times where understanding class content is beneficial. A parent/teacher connection can be extremely beneficial to a child’s learning. Educational research has made it clear that parents who are actively involved in their children’s learning at home help their children become more successful learners in and out of school. In addition to an increase in grades, parental involvement can aid in better attendance, higher graduation rates, more involvement in extra-curricular activities, and improved attitude and behavior.

**Problem Statement**

With students spending such a large percentage of their day with their classroom teacher, I believe it is important to have a connection between home and school. In the Greece, Central School District alone, there are a number of schools being scrutinized for their test scores, particularly in the area of math. My school, Longridge Elementary, is one of these schools facing the demands of raising test scores. To address the problem of low test scores, students who receive homework on a regular basis and complete it with parental support could show greater achievement than students who do not receive parental support on assignments or do not complete homework at all. According to Hsiung (2000) homework combined with parental support will increase academic success.

Parents often do not know how to help their students achieve in these subject areas. Providing parents with a better understanding of ways to help their children could increase their child’s success. This action research paper will focus on parental
involvement and student achievement related to test scores. It will also determine if student motivation increases as a result of parental involvement on homework.

Significance of the Problem

I believe that students showing low success rates in school can benefit when a homework program requiring parental assistance takes place. Strategies that increase understanding, grades, and motivation of students should result in an increase in overall achievement of both males and females in these fields. This study is also significant because its results may encourage teachers to incorporate a program regarding parental involvement with homework into all subjects of their curriculum.

Math scores also pose a significant problem because the school in which I work has been labeled by the state as needing academic improvement in the area of math. We are under constant pressure to raise test scores in this subject area so we can continue to be a competitive school district. As a teacher, I want my students to achieve success in mathematics so they will not be afraid to take risks and meet challenges placed upon them in upcoming grades and in the real world.

The purpose of this research project is to determine if there is a relationship between students' grades and parental involvement. Van Voorhist (2000) found that homework requiring parents to work with their child on a hands on assignment will increase student success in science as well as other subjects. This paper also aims to determine whether parental involvement on assignments increases motivation and success in school.
Rationale

Results from this study may play a significant role in my future lesson planning regarding homework assignments. If the action research shows that parental involvement increases grades I will continue to educate parents on how they can effectively help their children on homework and incorporate this type of program earlier in the school year. Findings from my research could give teachers and families direction to begin a homework plan that includes parental involvement.

To test whether or not parental involvement increases grades, I will monitor a group of students who will be required to complete homework assignments with a parent or guardian. I will look for patterns over four weeks to see if test grades, motivation, and homework completion rates increase. These students’ results will be compared to a second group of students who will receive the same homework assignment, but they will not be required to receive parental support.
Definition of Terms

- **Authoritarian parenting**- A style of parenting that is characterized as being high on obedience and authority.

- **Authoritative parenting**- A supportive style of parenting that encourages communication with their children while validating the child’s individual point of view.

- **Permissive Parenting**- A style of parenting where discipline and limits are often missing.

- **Cooperative Learning**- Small group learning where students work in teams to problem solve.

- **Inclusion**- Enabling all children to learn and participate effectively within mainstream school systems.

- **Integrated Curriculum**- Integration of several subjects into one curriculum.

- **Interactive Homework**- Assignments done at home that require the students to interact with other family members.

- **Mastery- Oriented Practices**- Aiding students in developing their competencies. This may involve direct teaching, encouraging students to solve problems on their own, and emphasizing the importance of understanding and effort.

- **Practice Homework**- Homework completed *after* a lesson has been learned in school. This type of homework aims to provide practice with the new learning and to assess if the desired learning has taken place.
• **Preparation Homework**- An assignment completed *before* a lesson is taught in school. Homework assignments such as reviewing an article prior to class lesson based on an upcoming topic is an example of this type of homework. It also aims to assess prior knowledge and to get the students thinking about the next topic of study.
Chapter II: Literature Review

For many years, parents and educators have worked to find the right combination of factors that will encourage and improve the academic success of students. There is considerable support for the benefit of strong parental involvement programs in school as well as home. Parental involvement in homework in particular can lead to higher student success and motivation.

Student achievement can be increased when an integrated approach to teaching is paired with a homework program encouraging parental involvement. An action research study was conducted in 2000 in Taiwan with two fifth grade classes. The teachers of these classrooms took on an “integrated-curriculum” approach to teaching. They chose to integrate science into the other subjects as they noticed that motivation was the lowest in this subject. According to Hsuing (2000) “An integrated approach to teaching allows students to spend more time doing science homework, and it requires them to use the science skills in other courses which can increase the student’s interest in science” (p.1).

This study also required parents to get involved in monitoring what their kids had learned in school and at home. The research team held several meetings with administration and parents before and during the study to help prepare for a smooth transition into this approach. As parents were asked to help students prepare for homework and tests, the teachers faced many complaints at first. Parents complained that they did not have the same resources available to continue on the child’s learning at home and that the textbook contents were not the same as what they used at home.
By referring to a curriculum plan adopted by the Ministry of Education in 1998, the research team was able to convince the parents that an integrated approach was the current trend in education.

Hsiung's findings showed that student motivation and interest increased with an integrated approach to teaching, but never mentioned an increase in academic grades. Through teacher observation and final student projects, this researcher noted that students were generally "more happy" about science and that they began to discover usefulness of science in home as well as school. An increase in homework combined with parental support showed an increase in student success in science (Hsiung, 2000).

To addresses the correlation between homework and student achievement one researcher discussed the use of "interactive homework", or homework that requires students to complete an assignment while interacting with other family members. Van Voorhis (2000) found that interactive homework along with parental support will increase student success in science as well as other subjects. The study involved 253 students from ten classes of sixth and eighth grade and lasted 18 weeks during the 1999-2000 school year.

Van Voorhis determined that students who were mostly assigned interactive homework requiring parental involvement received higher science grades than students assigned non-interactive homework without required parental involvement. The study also found, however, that accuracy and percentage of homework returned was the same for both groups. Levels of parental involvement were reported to be
higher in the interactive homework group, but the study found that no more family involvement was reported in this group when non-interactive homework assignments were given (Van Voorhis, 2000).

Students who received interactive assignments were required to “…think and act like a scientist, and to interact with a family partner”, (Van Voorhis, 2000, p.10). They were also required to have a parent signature on all work. Two-way forms of communication were also encouraged, which gave parents the opportunity to reflect upon the homework experience. Students who received the interactive assignments included the same content but required no parental involvement. Home-school communications were not stressed with the second group of students. The measurement instruments used to conduct this study included prior science grades of students involved, homework assignments, science exams, and surveys.

Another previous construct relevant to the effects of parental involvement in homework deals with parents’ confidence when it comes to assisting their children with science related activities and homework. Many times parents feel unable or doubtful that they have the intelligence needed to support their children’s educational learning in science. Research shows that there is a strong link between parent involvement and student success, and an article presented by Haury & Milbourne (1999) provides parents with the support and confidence they need to help their children succeed with homework. Haury & Milbourne address some common myths from a parent’s point of view and attempt to offer guidance. One myth for example states, “You need to know a lot about science to teach it to your children”. This myth
is not true. Saying to a child, "I don't know; let's find out together" is actually better than giving answers" (Haury & Milbourne, 1999, p.1).

Haury and Milbourne (1999) further present their findings on which websites could help parents and their children when they come across difficult questions during homework or are simply curious about a certain topic. They also provide specific homework tips for parents such as limiting after-school activities, planning a consistent homework schedule, checking assignments when completed, and reviewing homework that has been marked and returned.

A study lead by Foyle & Perne (1999) also researched the relationship between student success and parental involvement in homework. In this study, the researchers questioned whether or not cooperative learning practices in school combined with the assigning of homework would yield higher grades in science and other subjects. They also examined the differences between practice and preparation homework assignments and their effects on student achievement.

Practice homework is homework completed after a lesson has been learned in school. This type of homework aims to provide practice with the new learning and to assess if the desired learning has taken place. Preparation homework is assignments completed before a lesson is taught in school. Homework assignments such as reviewing an article prior to class lesson based on an upcoming topic is an example of this type of homework. It also aims to assess prior knowledge and to get the students thinking about the next topic of study.
The participants in this study included 64 fifth graders split into four sections. Teachers of all four classes were trained in cooperative learning and discussed common practices to be used throughout the study. Two classes did not receive any homework, a third class received preparation homework, and the fourth class was assigned practice homework. Results showed that the group of students doing cooperative learning, with the addition of homework, produced greater academic achievement than the group doing cooperative learning alone. No significant differences were found between the practice homework group and the preparation homework group (Foyle & Perne, 1999).

In an additional homework study conducted in Tennessee, Cooper and Jackson (2001) used a sample of 429 students from rural, urban, and suburban school districts in grades two and four to determine homework’s influence on school performance. This study revealed the critical role of parents in both the homework process and the success of elementary school students.

Participating families were periodically asked to fill out a “Homework Process Inventory” throughout the study. This was a questionnaire that asked parents about their child’s homework habits such as the amount of time spent on homework each night. To assess parent involvement during homework, parents were also asked to answer additional questions such as how often their child asked for help from a family member during homework and how often someone else helped with parts of the homework that the students should do themselves. The researchers also wanted to know if help from a family member made it harder for the students to do the
homework (Cooper & Jackson, 2001). The amount of time watching television was assessed throughout the study as well as the amount of time the student spent participating in extracurricular activities.

Although students' attitudes toward homework did not predict homework completion or classroom grades, positive parent facilitation of homework was associated with higher classroom grades. According to Cooper & Jackson (2001), "Positive parent attitudes towards homework not only predicts the amount of parent facilitation but also directly relates to the student's attitude about homework" (p.189).

In the Philadelphia School District, Weisburd (2005) researched the effects of an after school program the Homework Zone on student achievement. Thirty-eight of the lowest performing schools in Philadelphia collaborated on a homework support program which assisted ninth graders on class content and assignments. Weisburd indicated that this program was successful because after-school programs were ideal for more informal, experiential approaches to learning.

Student motivation to complete homework assignments increased as a result of this after school program. The Homework Zone was led by teachers, parents, and administrators so schedules were flexible enough for students to get the support when they needed, and group sizes were small to accommodate learning.

Training sessions were provided for all members involved at each homework site, and an incentive program was developed for all participating ninth graders. Students could earn academic credit based on periodic assessments and an 85% attendance rate. After the program went into effect, classroom teachers reported
improved student behavior, attitude, homework completion, and grades as a result of this after-school partnership, and the schools that ran most smoothly were the ones with the most open communication (Weisburd, 2005).

Pomerantz & Florrie (2006) examined parental involvement in students’ homework when they completed a study involving 14 students in grades three through sixth and their mothers only. The central goal of this research was to investigate the thesis that parents’ use of mastery-oriented practices, or practices that aid in student competencies, while assisting children with homework is particularly likely to enhance the well-being of children who view themselves as lacking the skills to do well in school. Mastery-oriented practices include direct teaching by parents, encouragement of children to solve problems on their own, and emphasis by parents on the importance of understanding and effort.

This study, researched in Illinois, examined parents’ mastery-oriented practices in the context of their daily assistance with their children’s homework. Children and their mothers completed telephone interviews and questionnaires at the end of each weekday after children had finished their homework. During the interviews mothers were asked to indicate whether their child had homework, if they helped them with the homework, and if they checked it over once it was completed. Parents were also asked to explain how much of their assistance helped the child to understand how to do the homework and how much they encouraged them to figure it out on their own (Pomerantz & Florrie, 2006).
The results of this research study showed that "The higher the level of mothers' assistance, the lower the negative emotional functioning among children with low perceived competence" (Pomerantz & Florrie, 2006, p. 104). The researchers attribute negative emotional functioning to times when the student feels disappointment, down, depressed, fearful, guilty, nervous, shameful, or worried.

Ronen & Eliahu (1999) piloted a study in Israel involving the effects of simulation based homework on student achievement in science when paired with parental support. While teaching electrical circuits to two ninth grade science classes, the researchers assigned computer based simulations for homework instead of typical pencil and paper assignments. Parents were also trained on how to provide effective support and feedback to their children. Their findings showed that most students favored using simulation in their home learning environment, and they also found it to be more interesting and effective than other types of homework activities (Ronen & Eliahu, 1999).

Many studies have shown a positive relationship between homework and achievement; however, one study conducted by Farrow and Tymms (2000) explains why a "more is better" idea of homework is not always appropriate. Twenty thousand students attending their final year of primary school in England were the subjects of this study. The information gathered on each student included achievement levels, attitudes, developed ability, home support, and gender.

This information was analyzed according to the Performance Indicators in Primary Schools, which is a project designed to determine which students were doing better or worse than might be expected based on student ability and home situations.
(Farrow & Tymms, 2000). Pupils were given questionnaire and response booklets based on homework, and they were also given three achievement tests in the subjects of science, mathematics, and reading.

The findings of this research showed a very small difference when comparing the amount of homework to students' achievement. In the area of science, the research showed that students who reported doing homework on a regular basis made less progress than those who did homework infrequently. The researches concluded that educators should take into consideration the nature and frequency of homework given in the primary school years because students are still developing their homework skills. They also believed that teachers should take into consideration the extent of parental involvement students receive at home with homework (Farrow & Tymms, 2000).

Director of the Center on School, Family, and Community Partnerships and of the National Network of Partnership Schools at John Hopkins University, Joyce Epstein (1992) argued that “students at all levels do better academic work and have more positive school attitudes, higher aspirations and other positive behaviors if they have parents who are involved, aware, knowledgeable, and encouraging” (p. 132). Kyriakides (2005) researched this argument when she examined the effects of parental involvement in students' work at a primary school in Cyprus. A policy implemented by the school encouraged parents to work with their children in school. Parents could come to their child's class anytime and work with them on various assignments and class activities.
Only six months after this partnership started, external assessments and teacher assessments showed that student achievement was higher in each core subject, and positive attitudes about school increased (Kyriakides, 2005). Written tests on content knowledge were also given to assess content knowledge. It appeared that the parents' educational backgrounds or occupations did not relate significantly to success rates (Kyriakides, 2005).

Using data from a national study of adolescents, Shumow and Miller (2001) looked at a sub sample of 60 families to examine the impact of parental involvement in the middle grades. These researchers compared the impact of home-based and school-based parental involvement on student achievement.

Through interviews with parents from 50 urban, rural, and suburban schools across the United States, Shumow and Miller concluded that parent involvement in education at home and school was positively related to young adolescents' academic success. The interviews revolved around four key issues: The number of visits parents made to the school to discuss their child's progress, whether and how often parents helped their child with homework, if the parents were involved in the school's parent organization, and the level of attention they paid to local school issues. Relationships between parents' education levels and the amount of involvement in their childrens' schooling were also researched. Grade point averages, math and science test scores, and student attitude reports were also used to assess student achievement in this study (Shumow and Miller, 2001).
The researchers found that parents reported being more involved with their children's education at school as their educational level increased. Another interesting finding was that parents of struggling or average students provided more help with homework than parents of successful students. A third finding of this study found that even though fathers' involvement in school activities was less visible at school, the amount of time spent at home helping their children was equal to that of mothers' help. They concluded that it is important to not overlook this fact when schools design parent involvement programs (Shumow and Miller, 2001).

To understand how and why parents involve themselves in their child's education Mapp (2002) conducted a case study in Boston, Massachusetts with 220 elementary school students and their families. The goal of this study was to explore the factors that influenced their participation in their children's education at home and in school.

Observations, data analyses, and interviews led the researcher to suggest that "Respectful relationships where power is shared between school staff and family members provide the glue that holds the community together and influences parental involvement at school and home" (p.15). Regardless of race, ethnicity, or socio-economic status parents have a strong desire to help their children succeed. The findings from this study indicated that parents clearly understood that their involvement helped their children's educational development.

Research indicates that parental interaction during the completion of homework is an important factor for improving home-school connections and
students’ academic achievement. Bailey and Silvern (2004) researched this statement when they examined the effects of interactive reading homework and parent involvement with children during homework on students’ responses to inference questions.

The participants involved in this study included 84 students and their parents from three elementary schools in Alabama. Using data from pre and post student inference tests and parent behavior checklists and questionnaires, the researchers concluded that interactive reading homework increased the students’ ability to draw inferences.

The researchers stated that, “although parental involvement in homework is necessary, the fact remains that it is difficult to engage parents in their child’s homework” (Bailey and Silvern, p.174). To increase engagement, teachers from these Alabama schools were required to attend a training session on how to create interactive homework on the topic of inferential questioning. Two of the three experimental groups received interactive homework assignments; however, the parents in one of these groups were instructed on the importance of doing homework with their children. The third group simply continued their program of instruction with no specific parent interaction.

The interactive assignments encouraged discussion between parents and their children. These discussions were intended to assist the students in drawing conclusions from a reading selection. Bailey and Silvern reported that although there was no significant difference in results between the groups that did or did not receive
parental instruction, interactive homework alone produced increased ability to make inferences (2004).

Students with disabilities can also benefit from a homework program that encourages parental involvement. For students with disabilities, homework may pose a significant challenge due to students’ lack of motivation, attention, and demonstration of study skills. For homework to be beneficial to students with disabilities, parental involvement is critical, and teachers and parents must communicate clearly and effectively with each other and with students about homework policies, practices, expectations, and difficulties (Epstein and Bursuck, 2001).

Epstein and Bursuck conducted a national survey consisting of 265 general education parents and 83 special education parents. The goal of the survey was to determine whether these two groups had different experiences with homework, and the extent to which they agreed with each other regarding communication problems with homework. The results from this survey revealed that both sets of parents had similar experiences with homework and that both groups felt that teachers should be more time efficient in their communication about homework. The parents also felt that the teachers lacked information about their child’s needs. A homework program based parental involvement and effective communication can be beneficial to students with disabilities.

Teachers also need to be aware of their students who have parents that speak a language other than English so they can effectively involve their parents in school
related situations including homework. Pena (2000) researched factors that influenced a higher level of parental involvement in Mexican-American families. The researcher cooperated with four teachers in grades kindergarten through fourth. At each level, one class had students whose parents primarily spoke English and the other had primarily Spanish speaking parents. To research involvement and communication between school and family members, data was gathered from home visits, parent meetings, informal discussions, and observations of parent-teacher conferences.

According to Pena, the level of parental involvement in school activities and homework was determined by cultural attitudes about the role of parents, language barriers, and parents' education levels. Attitudes of staff members at the school and family issues such as childcare also influenced the level of involvement of parents in their child's schooling (2000). Parents then gave recommendations for improving parent involvement in their school such as having a more welcoming attitude and taking parents' interests into consideration when planning activities or assignments. An additional recommendation given by these parents stated that teachers should recognize that even if parents cannot be present at school, helping their children at home is also a valuable contribution, and providing parents with knowledge about how to be involved can be beneficial to their child's success (Pena, 2000).

Because parents are often the key to improving struggling learners' academic and homework success, Margolis (2005) researched parent perceptions about homework and their involvement with their children's assignments. When asking
parents if they should tutor their children and teach them what they need to learn and succeed on homework, the researcher received three different answers.

First, parents felt that if they had to teach their child the skill of information, then the homework exceeds the child’s independent level, and the child had not acquired the skill or knowledge and is most likely too difficult. The second response stated that parents may confuse their children if they present information differently from how the teacher does. Finally, parents felt if doing homework with their child causes family stress and conflict then parents should stop these joint activities. They feel that continuing these activities increases the odds that negativity, anxiety, and anger will intensify, motivation for schoolwork will decrease, and little or no learning will occur (Margolis, 2005).

Despite these warnings, Margolis offered parents a few strategies they can try at home to avoid these negative effects. Setting a quiet place and time to do homework, providing help when their child requests, and making encouraging comments are some strategies the researcher suggested to parents. He also recommended that teachers should maintain contact with the parents and should invite them to participate in a school-home reinforcement system.

According to Battle-Bailey (2003), designing homework to increase parent involvement and incorporate goal setting should also be encouraged to avoid negativity, anxiety, and angry behaviors from children. She believes that constructivist techniques, or techniques that require children to construct their own understanding through interactions with adults, foster students’ abilities to self-
manage the completion of their homework. When teachers design homework with a constructivist approach in mind, students are more intrinsically motivated and self-directed when completing the assignment (Battle-Bailey, 2003).

For teachers to design constructivist homework assignments, Battle-Bailey feels that teachers should attend a training workshop, which consists of three to four sessions during the school year. These training sessions would show teachers how to evaluate parent and student interests through the use of “Interest Inventories”, develop vocabulary lists to involve students in word study across the curriculum, and encourage parents to use their experiences to tutor students during the completion of homework.

In addition to these strategies, Battle-Bailey states that teachers will also learn how to write clear directions for homework assignments to facilitate productive parent-child dialogue about vocabulary and inference questions or word problems (2003). Gathering data on the student’s family and background is also recommended.

If struggling learners routinely have difficulty successfully completing homework with moderate effort, teachers must address their problems. If these problems are not addressed they will most likely worsen and negatively affect the learners’ grades, achievement, and motivation.

By designing homework to match students’ abilities, preparing them for their homework, linking homework to goals, and working with parents who want to help their children, teachers can increase the likelihood of student success. Recent research seems to indicate that homework that is interactive or constructivist in nature
positively impact student academic outcomes, parental involvement, and teachers’ abilities to design homework to meet the needs of all students.

Based on the information presented in this literature review, parental involvement in homework can increase student success and motivation when a successful home-school connection in established and effective communication takes place between parents and teachers.

Chapter III: Application and Evaluations
Introduction

I believe that students showing low success rates in school can benefit when a homework program requiring parental assistance takes place. Strategies that increase understanding, grades, and motivation of students should result in an increase in overall achievement of both males and females in these fields. The results of this study may encourage teachers to incorporate a program regarding parental involvement with homework into all subjects of their curriculum.

The objective of this research project was to determine if there was a relationship between students’ grades and motivation, and parental involvement. The target group from this study included twenty third-grade students from Longridge Elementary School in the Greece Central School District located in Rochester, New York. This study mostly targeted students who were in need of academic improvement, but it also aimed to support and strengthen the grades of higher achieving students as well.

An increase in students’ understanding of mathematical content and an overall increase in success, (grades, motivation, and effort) was the goal of the study. If parent involvement in homework shows to be an important factor in the success rate of students in math, I will incorporate necessary requirements, such as parent information sessions, for success of students to occur again in the future.

Participants
Twenty students participated in this study along with their parents. These third grade participants included twelve girls and eight boys with ages ranging from eight to nine. This target group mainly included students of American decent with Caucasian students making up ninety percent, and African American students making up ten percent of the class. The academic ability levels were diverse and ranged from students who received Academic Intervention Services for math to students with more accelerated math ability. Twenty percent of the students involved in this study received math support twice a week.

The students' parents were also active participants of this study, as they either observed or assisted their children as they completed the homework assignments.

As the participating teacher and researcher, I received a Bachelors degree from The State University of New York College at Brockport and I am certified to teach kindergarten through sixth grade. I am currently teaching third grade at Longridge Elementary School and am in my second year of teaching.

Procedures for Study

After sending home letters on to parents outlining the procedures and tasks of the study they would be involved in (See Appendix A), initial surveys (See Appendix B) were administered to students to examine relationships between attitudes about homework and the level of student success. Weekly surveys (See Appendix C) attached to the assignments were also administered to parents and
students. These surveys tracked changes in attitudes and perceptions regarding homework.

To determine if parental involvement increases grades and motivation, ten students were given homework assignments (See Appendix D) for five weeks requiring parental support, and ten students were given the same assignments without the requirement of parental support. When all assignments had been collected, the entire class reviewed the answers together as a class. The students then received an assessment (See Appendix E) that was completed independently in class the following day to determine if one of the groups yielded higher scores. This process repeated four additional times.

*Instruments for Study*

Both groups of students, students who received homework requiring parental involvement and students required to complete the work independently, received informative letters (Appendix A) on the procedures and tasks regarding the assignments. Another instrument used in study included *Math Today* homework worksheets (See Appendix D), which are included as part of the Greece Central School District’s approved math program called, *Investigations*. These worksheets were given once a week to all students. The homework provided to the group requiring parental support also received a home/school connection piece as well. This piece was used to inform parents on what the child had learned in school to be able to successfully complete the worksheet.
These homework assignments measured whether the students practiced and expanded on their learning from math class. It also measured whether or not parents participated in the homework and how long they spent working with their child on the required task.

Surveys (Appendix C) attached to the weekly homework assignments were given to both groups of students. These surveys measured students’ motivation for completing the math assignment, and they were used to assess whether or not this motivation increased due to parent involvement on homework assignments. They were given throughout the study to evaluate growth and change over time.

Grades from assessments given throughout the study were also used in this research. Averages were calculated and compared between the two groups to see if there was a relationship between grades and parental involvement during homework assignments. The grading consisted of a scale ranging from one to three, and it was consistent with the district’s standards for assessment of elementary school students. The following scale was used:

1- Student has not met the requirements of the assignment
2- Student is still working towards meeting the requirements of the assignment
3- Student has met the requirements of the assignment
Chapter IV: Results

The action research began with a student questionnaire to look for relationships between students’ perceptions about homework in general, their reliance on a parent for support, and their confidence in completing the assignments. Using a scale of never to always, the students were asked to rate how much they agreed with a given statement. The first statement asked students if they feel homework takes up time they would rather spend with family. The second question asked students if they usually complete homework alone, and the third question asked students if they believed that homework helps them learn. The students were also asked if completing homework was enjoyable and if they thought that assignments are hard for them and their parents.

Student Homework Survey

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>Seldom</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework takes up time I'd rather spend with my family.</td>
<td>4.8%</td>
<td>19.0%</td>
<td>38.1%</td>
<td>28.6%</td>
</tr>
<tr>
<td>I usually do homework by myself.</td>
<td>4.8%</td>
<td>28.6%</td>
<td>38.1%</td>
<td>19.0%</td>
</tr>
<tr>
<td>The homework I do helps me learn.</td>
<td>4.8%</td>
<td>19.0%</td>
<td>14.3%</td>
<td>52.4%</td>
</tr>
<tr>
<td>Homework is enjoyable for my parents and me.</td>
<td>4.8%</td>
<td>19.0%</td>
<td>38.1%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Homework is hard for my family and me.</td>
<td>4.8%</td>
<td>28.6%</td>
<td>38.1%</td>
<td>19.0%</td>
</tr>
</tbody>
</table>

Table 1

Fifty-seven percent of the students responded that they often or always complete homework by themselves. Sixty-six percent of the students also said that homework often or always takes time away from family togetherness. An observation from the
survey showed that sixty-seven percent of the students felt that the homework they do helps them learn.

Table 1 shows that about sixty-seven percent of the students feel that homework is enjoyable for them and their parents. Fifty-seven percent also believe that homework in general is hard for them and their families.

The final question given to students on the initial homework survey asked them to rate the amount of help they receive on homework. They were given a scale of 0 to 10, with 0 being no help and 10 being always gets help.

**Student Homework Support Levels**

| How much help do you get when you do your homework? |
|-----------------|-----------------|-----------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 33.3% | 0.0% | 4.8% | 0.0% | 14.3% | 23.8% | 0.0% | 4.8% | 0.0% | 4.8% | 4.8% |

*No help* | *Some help* | *Always get help*

Table 2

The table above shows that approximately seventy-five percent of students reported that they receive some to no help on their homework assignments. Thirty-eight percent of the students claimed that they receive help from a family member from some of the time to always.
The students were then given their first homework assignment to either complete with a family member or individually. When homework was collected and scored, I averaged the scores to compare percentages yielded by the independent and cooperative working students. The students in the independent group were required to complete the assignment alone, and the cooperative group included the students who worked with a family member. I also averaged the scores on a quiz given that followed the homework assignment.

**Homework Results- Assignment 1**

<table>
<thead>
<tr>
<th></th>
<th>Cooperative</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Scores</td>
<td>73 %</td>
<td>59%</td>
</tr>
<tr>
<td>Quiz Scores</td>
<td>80%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Table 3

After averaging the scores of the cooperative homework group and the independent homework group, the scores showed that the group working with their parents scored higher with a seventy-three percent compared to a fifty-nine percent scored by the independent group. The results from the quiz that followed the homework assignment showed that the students in the cooperative group averaged an eighty percent while the students in the independent group averaged an eighty-five percent.
I then ran four additional trials across four weeks, to compare results of the homework and assessment percentages from both groups of students, cooperative and individual.

**Homework Results- Assignment 2**

<table>
<thead>
<tr>
<th></th>
<th>Cooperative</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Scores</td>
<td>90 %</td>
<td>74 %</td>
</tr>
<tr>
<td>Quiz Scores</td>
<td>60 %</td>
<td>73 %</td>
</tr>
</tbody>
</table>

**Table 4**

According to Table 5, the students working with their parents averaged a higher percentage, ninety-percent, on the second assignment than the students who worked independently, seventy-four percent. The independent group averaged a higher score on the quiz this time as well. They received a seventy-three percent on the quiz compared to a sixty-percent earned by the cooperative group.
Homework Results- Assignment 3

<table>
<thead>
<tr>
<th></th>
<th>Cooperative</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Scores</td>
<td>76 %</td>
<td>92%</td>
</tr>
<tr>
<td>Assessment Scores</td>
<td>81%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Table 5

As indicated in Table 6 above, the independent homework group averaged higher on the assignment, ninety-two percent, and the quiz, ninety percent. Previously, it had been the cooperative group that scored higher on the homework assignment, and the independent group that scored higher on the quiz.

Homework Results- Assignment 4

<table>
<thead>
<tr>
<th></th>
<th>Cooperative</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Scores</td>
<td>80 %</td>
<td>76%</td>
</tr>
<tr>
<td>Quiz Scores</td>
<td>86 %</td>
<td>90 %</td>
</tr>
</tbody>
</table>

Table 6

For assignment number 4, the independently working homework group averaged higher on the quiz, but slightly lower on the homework assignment. The independent group received a seventy-six percent on the quiz and a ninety-percent on the assessment. The cooperative group averaged an eighty percent on the homework and an eighty-six percent on the quiz.
Homework Results- Assignment 5

<table>
<thead>
<tr>
<th></th>
<th>Cooperative</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Scores</td>
<td>77 %</td>
<td>76 %</td>
</tr>
<tr>
<td>Quiz Scores</td>
<td>43 %</td>
<td>56 %</td>
</tr>
</tbody>
</table>

Table 7

The scores were lower on the quiz for both groups in this trial. Based on the data collected, the same pattern of results occurred in the last trial as well. The students working cooperatively with their parents scored higher on the homework and lower on the quiz. A seventy-six percent was averaged for the independent group on the homework assignment and a fifty-six percent on the quiz. The cooperative group averaged a seventy-seven percent on the homework and a forty-three percent on the quiz.

While analyzing the feedback received from parents in the cooperative group on the homework assignments, I looked at the question that asked, “Do you feel that your child often relied on a family member for support during the assignment?” The parents in this group were asked this at the end of each assignment, and I averaged the responses from all homework questionnaires to look for relationships between over-reliance on family members and overall success on learning the material.

At the conclusion of each assignment parents from the cooperative group were asked if their child was open to receiving support from a family member. I wanted to see whether or not the students desired to work alone even though they were required
to work along with their parents. At the end of each independent homework assignment there was a question that asked parents whether or not their child asked for their assistance. I wanted to see if the students would ask their parents for help even though they knew they were to complete the assignment alone.

**Parent Questionnaire Responses**

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you feel that your child often relied on a family member for support?</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Was your child open to receiving support from a family member?</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Did your child ask for your assistance on the homework?</td>
<td>32%</td>
<td>68%</td>
</tr>
</tbody>
</table>

**Table 8**

Sixty- percent of the parents felt that their child often relied on them for help while completing the homework assignment together. Forty-percent of the parents reported that their child did not often rely on them for support with the homework.

As indicated in the Table 8 above, one hundred- percent of the parents felt that their child was open to receiving support from a family member while completing the assignments. None of the parents reported that their child was not open to receiving support.

As shown in the table above, students from the independent group asked for parental support on the assignments thirty-two percent of the time, while sixty-eight percent of time students continued working without asking for assistance.
Another piece of information I analyzed was the question that asked how confident the parent and child were that the assignment was completed accurately.

Parents from both groups, independent and cooperative, were asked to rate their confidence level on a scale from 1 to 10, with 10 being most confident in the assignment being completed accurately. Students were also asked to rate their confidence. Ratings from each assignment were averaged to find an overall level of confidence from both homework groups.

**Parent Questionnaire Responses Continued**

<table>
<thead>
<tr>
<th>Parent and Student Confidence Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Independent</td>
</tr>
<tr>
<td>Cooperative</td>
</tr>
</tbody>
</table>

**Table 9**

The students in both groups were more confident than their parents that the assignment was completed correctly. Students averaged a 10 in the independent group and a 9 in the cooperative group. Parents in the cooperative group averaged a lower confidence level when rating whether or not they felt the assignment was completed accurately. The parents in the independent group averaged a 9 while the parents in the cooperative group averaged an 8.
Chapter V: Conclusions and Recommendations

The purpose of this action research was to determine whether or not parental involvement on homework had an impact on a student’s success in math. Two groups of students were analyzed throughout this study. A group of students, referred to as the independent group, were asked to complete each of five homework assignments by themselves, while a group of students labeled as the cooperative group were asked to complete each assignment with a family member.

While looking at the results of the initial homework surveys an interesting relationship was revealed. Students value time spent with their family, and completing homework with a parent instead of doing it independently increases this time spent together. This time together could increase student motivation towards completing homework. One hundred percent of the families in the cooperative group responded that their child was open to receiving support on each assignment. This reinforces the fact that children enjoy spending time with their families, even if it is when they have to complete a homework assignment.

The initial surveys revealed, however, that parents do not often help their children with their homework. The students were asked to rate how much help they receive help with homework on a scale of 0 to 10, with 10 meaning they always get help. The results mainly ranged from 5 and below, with the largest percent, thirty-three, reported at 0. Because the students are used to completing homework alone, this could be why the independent group’s parents reported that their children mainly did not ask for support on the assignments.
I noticed an additional relationship when comparing responses from the student survey. Sixty-seven percent of the students believed that homework in general is enjoyable for them and their parents. Almost the same percent of students reported that homework is hard for them and their families. This was interesting to see because I believed that if students thought of their homework assignments as “hard” they would not think of them as enjoyable.

The survey also showed that students believed that homework helped them learn. When students recognize the value in homework they will be more motivated to complete each assignment. In addition, when parents see the importance in homework assignments, students will most likely perceive homework to be valuable as well.

Upon reviewing the first set of returned assignments I noticed that the homework completed by the cooperative group showed many errors, despite the given directions and the “Family Connection” piece. Overall, on homework assignments completed by both groups of students, directions were not followed completely, counting errors occurred, and pictures were drawn incorrectly. Based on the first trial of this homework study I do not feel that the parents committed to the amount of time needed to successfully complete the assignment with their children.

While asking students to answer questions when reviewing the homework it was difficult to track which students were eager to participate. As students noticed that I was taking tallies on who was raising their hands, more students began to volunteer. I did notice, however, at first glance that the students who often participated in class were the ones raising their hands. It was interesting though to see a couple of
students, who rarely participate, volunteer their answers. This was interesting because these students *had* worked with their parents on the assignment. When I called on these students, however, they came up with the wrong answer even though their homework assignment showed a correct answer. This showed that working with their parents did not increase students’ recall after the assignment was completed. However, it did show that their confidence increased having had worked with a family member.

Overall, the independent group averaged higher scores on the assessments and lower scores on the homework. This could be because the students in the cooperative group were over-relying on their parents for support during the assignments. When it came time for the test, these students may not have been able to recall the information as efficiently because they did not have to be as dedicated to the assignment as the students working independently as they could only rely on themselves for answers.

I also made an observation about the percent of students who turned in the homework on time. From the cooperative group, only seventy-percent of the students turned in the assignment on time compared to ninety-percent returned from the independent group. This could of occurred because the students in the cooperative group had to work with their parents who may not have had “time” to complete the assignment with them. The students had to rely on their parents to support them on the assignment, which may have occurred when parents were willing to devote the time in assisting their child.
In regards to confidence levels, I had assumed that the parents in the cooperative group would have reported a higher level of confidence in the assignment being completed accurately, being that the child got to work directly with them. However, the parents in the independent group reported a higher level of confidence in their child completing the assignment accurately. Considering that this group of students scored lower on the homework assignments, it was interesting to see that the parents were more confident in them. This could have occurred because the independent working students were asked to complete the homework without assistance from a family member. As the child progressed through each assignment without asking questions, the parent could have assumed that the child understood the problems presented.

I was glad to see that in both groups, the students had a high rate of confidence that they completed the assignment accurately. The independent working students could have showed slightly higher confidence levels because they were not receiving comments back from their parents highlighting errors.

Based on the results from my action research I am able to come up with the following conclusions. A homework program that supports parental involvement may only be beneficial when the parents are educated on how to assist their children during the assignments. In addition, students who work with their parents on homework assignments may not provide any more motivation than those who worked on the assignments alone. A struggling student could show more motivation towards a subject when he/she receives extra support by their parents.
To effectively involve parents into a collaborative homework program, teachers must provide them with knowledge on ways they can help their children. Teachers can assist parents in understanding how to get their children to gain and retain the information needed to complete the following assessments with success.

If I had to do this research project over I would provide parents in the cooperative group with a background on each assignment. I could see that in some cases, the parents had a negative effect on helping their child because they had showed them how to complete the problem incorrectly. I would also consider having the independent group of students complete their assignments during school to fully ensure that these students were completing the assignments alone.

From my current research I would give the following suggestions to my students' parents. Asking the child to read and think about the directions of the assignment would be my first recommendation. I noticed that during the assessments throughout my action research, the students who worked with their parents asked for more help with the directions. The directions were often the same as what they had seen on the homework. This tells me that the parents either read the directions to their child, or they read the directions to themselves first and then restated the task.

The independent group on the other hand could only rely on themselves for reading the directions and deciphering what they were asked to do. Asking parents to let the child determine the task by reading the directions first may help students strengthen their understanding of what is to come. They will also be familiar with the material when they see it again during an assessment.
Another recommendation for parents would be to allow their child to try the worksheet on their own first and then to check the answers over together when complete. Based on my observations, I could tell that the parents did not give their children the chance to figure it out on their own. When parents check over the assignment with their child, they can see where their child may have went wrong and help guide them towards a correct answer. Being in close proximity to clarify directions or to answer questions can also be beneficial to the children. Students working in the cooperative group reported throughout the study that they felt “good” knowing that they could rely on their parents for support. It is important for parents to recognize though when their children are over-relying on them for support.

A final homework recommendation I would give to parents is that they should fully devote their attention to the child when working with them during an assignment or checking it over at the end. It was easy to see that parents did not commit their time to working with their children. Many questions were left blank and wrong answers were recorded that could have been avoided by rechecking. The students often told me that their parents were “busy” on certain days and therefore they put it off. It is important that the homework gets completed when assigned because it is often an extension of what the child had learned in school that day. Waiting until a “better” time could cause the student perhaps forget the strategies learned in class to complete the assignment with success.

I have an additional recommendation for teachers creating a homework program that incorporates parental involvement. Through my observations of errors
of the cooperative working group, I think it is important for teachers not to assume that parents will in fact understand the assignment or the concepts presented. When I began this action research project I assumed that parents could figure out the directions and concepts of the assignment. In turn, I believed that this would benefit the students as parents could assist them with the directions and accurate completion of the assignment. I began to think about how math has changed over the years, and unless the parents were actively involved in their child’s math curriculum, they may not fully understand how the assignment should be completed accurately.

In my school district, elementary students are not provided with math textbooks containing examples and practice problems. Providing parents with examples or training on “how” the students are solving math problems prior to a collaborative homework program could help parents’ ability to assist their children with homework.

Teaching parents to create a healthy balance of support and independence on homework assignments can help students retain the information in a more meaningful way. As I prepare for teaching third grade again next year, I look forward to opportunities that will involve parents in homework. I am now better prepared to initiate a more effective program and am eager to see my students’ success in math grow!
References


Appendices
Appendix A: Initial Letters to Parents and Students
Dear Third Grade Families,

As part of my research requirements for a master’s degree in education from SUNY Brockport I am conducting a study on the effects of parental involvement in homework. This involves an initial survey of six questions, and then five following questionnaires consisting of three questions each. Each survey will take approximately three minutes to complete. The answers to this survey are important because it will be used to inform me about parents’ perceptions about homework and any relationships between student motivation and grades.

You are being asked to participate in this study, and your answers to the enclosed survey signify your consent to participate. Please do not write your name on the initial survey. There will be no way in which you or your child will be connected to this survey, and results will be reported in aggregate form only. All data will be kept secure and anonymous. You do not have to answer any questions that you do not want to answer, and you may stop participating in the survey at any time. In addition, there will be no personal risks or benefits to you or your child by participating.

It is hoped that approximately 90% of parents will participate in the study. The results will be used to examine the relationships between motivation and achievement when paired with parental involvement on homework assignments.

Also enclosed is the first assignment for the students to complete.

Thank you for your participation in the survey. You may return the completed survey by Tuesday, May 15. If you have any questions regarding this study you may contact me.

Staci Masseth
Longridge Elementary School
966-5783
Staci.Masseth@greece.k12.ny.us

Parent Signature ____________________________ Date ____________________________
May 11, 2007

Dear Third Graders,

I am taking a college course at SUNY Brockport, and I am studying the effects of parental involvement on student achievement and motivation. I will be asking half of you to complete five homework assignments with a parent and half of you to complete the same assignment on your own.

If you decide to participate, I will give you one survey on your thoughts about homework and then four surveys consisting of three questions each that will go along with the required assignments. I will take notes on my observations and collect some of your student work I will use only your first name when I share your work with other teachers and researchers.

Your parent or guardian has given permission for you to take part in this project, but it is your decision to participate. If you decide to participate, but change your mind later on, you can tell me that you have changed your mind. It is okay to change your mind at any time.

If you are willing to participate in this research study by completing five surveys, allowing me to collect some of your work samples, write notes in my journal about what I observe and share the data with others, please write your name below. Beneath your name, please print the date.

Thank you,

Mrs. Masseth

Name ____________________________________________________________

Date ___________________________________________________________
Appendix B: Initial Surveys for Participating Students
Student Homework Survey

For Questions 1 to 5, please circle the word that best describes your level of agreement with the sentence.

1. I usually do my homework by myself.
   - Always
   - Often
   - Seldom
   - Never

2. Homework is enjoyable for my parents and for me.
   - Always
   - Often
   - Seldom
   - Never

3. Homework takes up time I'd rather spend with my family.
   - Always
   - Often
   - Seldom
   - Never

4. The homework I do helps me learn.
   - Always
   - Often
   - Seldom
   - Never

5. Homework is hard for my family and for me.
   - Always
   - Often
   - Seldom
   - Never

6. Mark the scale below with an X to show how much help you get when you do homework.

   0------1--------2--------3--------4--------5--------6--------7--------8--------9--------10
   No Help   Very Little Help   Some Help   Lots of Help   Always Get Help
Appendix C: Weekly Homework Questionnaires for Parents and Students
Homework Assignment- (Independent)

May 11, 2007

Dear Parents,

Thank you for participating in my study regarding parental involvement in homework and the effects on student achievement.

The attached homework assignment has been given to each student in your child’s class. Half of the class is being asked to complete this assignment independently, and the other half is being asked to complete it with support from a family member.

I would like your child to complete the assignment independently, without assistance from a family member. I assure you that the results will not affect your child’s grade in any way. The data will be used to examine relationships between student success and parental involvement in homework.

Please answer the following questions when your child concludes the homework assignment. (Please keep this form attached).

Thank you!

Staci Masseth

For questions 1-3, answer after your child completes the attached homework assignment.

1. Did your child ask for your assistance during the attached homework even though they were asked to complete it alone? Yes No

2. If yes, how did your child react to not being able to get support on the assignment?

3. On a scale of 1-10, with 1 being not confident and 10 being most confident, how confident are you that your child completed the assignment accurately? ___

Parent Signature X
Homework Assignment (Independent)

May 11, 2007

Dear Students,

Please answer the following questions when you have finished your homework assignment.

Thank you,

Mrs. Masseth

For Questions 1-3, please answer after you have completed the attached assignment.

1. Did you ask a family member for help on the assignment? Yes No

2. If yes, how did you feel when your family member did not support you?

3. On a scale of 1-10, with 1 being not confident and 10 being most confident how confident are you that you did well on the assignment?
Homework Assignment (Cooperative)

May 11, 2007

Dear Parents,

Thank you for participating in my study regarding parental involvement in homework and the effects on student achievement.

The attached homework assignment has been given to each student in your child’s class. Half of the class is being asked to complete this assignment independently, and the other half is being asked to complete it with support from a family member.

I would like your child to complete the assignment with the assistance of a family member. I assure you that the results will not affect your child’s grade in any way. The data will be used to examine relationships between student success and parental involvement in homework.

Please answer the following questions when your child concludes the homework assignment. (Please keep this form attached).

Thank you!

Staci Masseth

For questions 1-3, answer after your child completes the attached homework assignment.

1. Was your child open to receiving support from a family member during the assignment? Yes No

2. Do you feel that your child often relied on a family member for support? Yes No

3. On a scale of 1-10, with 1 being not confident and 10 being most confident, how confident are you that your child completed the assignment accurately? ___

Parent Signature X
Dear Students,

Please answer the following questions when you have finished your homework assignment.

Thank you,

Mrs. Masseth

For Questions 1-3, please answer after you have completed the attached assignment.

1. Knowing that a family member could help you on the assignment do you think that you relied on them for help? Yes No

2. While completing the assignment, how did you feel knowing that your parents could help you? Why?

3. On a scale of 1-10, with 1 being not confident and 10 being most confident how confident are you that you did well on the assignment?
Appendix D: Homework Assignments
Color Four
Color more spaces to make each shape have an area of 4 square units. REMEMBER: Each shape must have full sides touching.

Mixed Review and Test Prep
Mrs. Hill has 24 pencils. There are 12 boys and 14 girls in the class. How many more pencils does Mrs. Hill need for each student to get one?

A. 1 more  B. 2 more  C. 3 more  D. 4 more
**Flips, Turns, and Area**

**Same or Different?**
Which pairs of shapes are congruent? Could you turn and/or flip the shapes to fit exactly on top of each other? Draw a circle around each pair of shapes that match exactly.

1. 
   - ![Shape 1A](image1.png)
   - ![Shape 1B](image2.png)

2. 
   - ![Shape 2A](image3.png)
   - ![Shape 2B](image4.png)

3. 
   - ![Shape 3A](image5.png)
   - ![Shape 3B](image6.png)

4. 
   - ![Shape 4A](image7.png)
   - ![Shape 4B](image8.png)

5. 
   - ![Shape 5A](image9.png)
   - ![Shape 5B](image10.png)

6. 
   - ![Shape 6A](image11.png)
   - ![Shape 6B](image12.png)

**Mixed Review and Test Prep**

7. You want to move from 54 to 76 on the 100 chart. Which number string shows a way you could do it?
   - A. $54 + 30 + 2 + 10$
   - B. $54 - 30 + 2 - 10$
   - C. $54 + 20 - 2 + 10$
   - D. $54 + 10 + 2 + 10$

**Family Connection**

Students have been working with the idea of congruence. Figures are congruent if they are exactly the same size and shape. **Questions you might ask your child:** “How would this shape have to be moved in order to fit it exactly on top of the other shape? Would you flip it? Would you turn it?”
Flips, Turns, and Area

**Exactly Six!**

Draw a different shape on each dot grid. Each shape has to have an area of 6 square units.

1. Use only squares.

2. Use only triangles.

**Mixed Review and Test Prep**

3. 14 students were surveyed to find out how many teeth they had lost. The greatest number of students lost 8 teeth. Which line plot could show the data?

A.  

B.  

C.  

D.  

(Use during Investigation 2 (Finding Area), Sessions 4 and 5.)
Match the Shapes

Color the tetromino on the right that is the same shape as the one on the left.

Mixed Review and Test Prep

5 Strip A is half as long as Strip B. Strip C is twice as long as Strip B. Which object is twice as long as the eraser?

A. scissors  B. book  C. glue  D. crayon
Going Up!
Write the net change for each elevator trip. Use the picture to help you.

<table>
<thead>
<tr>
<th>Starting Floor</th>
<th>Ending Floor</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>1</td>
<td>+3</td>
</tr>
<tr>
<td>2</td>
<td>B3</td>
<td>-5</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>B4</td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>B5</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Mixed Review and Test Prep
Which is not a way to show 5?
A. 7 - 2  
B. 3 + 1 + 1  
C. 2 + 0 + 3  
D. 8 - 4

Use during Investigation 1 (Net Change), Sessions 1 and 2.
It's in the Cards

Fill in the blank change cards to make the net change shown. You can use these change cards:

\[ -3 \quad -2 \quad -1 \quad 0 \quad +1 \quad +2 \quad +3 \]

1. Net change: \(-2\)
   
   \[ +3 \quad -2 \quad +1 \quad -3 \quad 0 \]

2. Net change: \(+3\)
   
   \[ -3 \quad -1 \quad +2 \quad -1 \quad +2 \]

3. Net change: \(-5\)
   
   \[ +2 \quad +2 \quad -3 \quad -3 \quad +2 \]

4. Net change: \(0\)
   
   \[ +1 \quad +3 \quad -2 \quad 0 \quad +1 \]

Mixed Review and Test Prep

5. What is the value of these coins?

A. 13¢
B. 25¢
C. 35¢
D. 85¢
Appendix E: Assessments
Color more spaces so each has an area of \( \frac{\text{4}}{\text{square units}} \).

Circle the ones that are congruent.
Strictly Seven!

Draw a different shape on each dot grid. Each shape has to have an area of 7 square units.

1. Use only squares.

2. Use only triangles.

3. Sergio cut 3 symmetrical shapes out of folded paper. Which shape is not Sergio’s?

A.  

B.  

C.  

D.  

Family Connection

Students are continuing to explore the idea of the areas of shapes. On this page, students draw shapes having an area of 7 square units. **Questions you might ask your child:** “How could you change the shape in Exercise 1 so that it has 8 square units?” “How could you change the shape in Exercise 2 so that it has 6 square units?”
**It's Your Move**

How was each tetromino moved? Circle **slide**, **turn**, or **flip**.

1. [Diagram of tetromino] **slide**  **turn**  **flip**
2. [Diagram of tetromino] **slide**  **turn**  **flip**
3. [Diagram of tetromino] **slide**  **turn**  **flip**
4. [Diagram of tetromino] **slide**  **turn**  **flip**
5. [Diagram of tetromino] **slide**  **turn**  **flip**
6. [Diagram of tetromino] **slide**  **turn**  **flip**

**Mixed Review and Test Prep**

You need only 15¢ more to have $1.
Which coins might you have?

- A. 3 quarters  2 dimes  1 nickel
- B. 2 quarters  3 dimes  4 nickels
- C. 1 quarter  5 dimes  2 nickels
- D. 1 quarter  2 dimes  6 nickels

Use after Investigation 1 (Motions with Tetrominoes), Sessions 2 and 3.
Comparing Elevator Trips

Write the net change for each trip. Use the picture to help you.

<table>
<thead>
<tr>
<th>Starting Floor</th>
<th>Ending Floor</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>B2</td>
<td>B4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>B2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>B4</td>
<td>B2</td>
</tr>
<tr>
<td>6</td>
<td>B4</td>
<td>2</td>
</tr>
</tbody>
</table>

7 Name two problems above that result in the same net change. Why do they have the same net change?

8 Make up a trip that has the same net change as the trips you listed in Problem 7.

Mixed Review and Test Prep

9 How many bikes can be made with 20 wheels?
   A. 40  B. 20  C. 10  D. 5
Directions: Fill in the blank cards to make a net change of -2.