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Peer Interaction and Academic Achievement Using Jigsaw Techniques With First-Grade First and Second Language Learners

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Abstract

This study examined peer interaction and academic achievement using the Jigsaw-group mastery learning approach developed by E. Aronson (1997). Aronson’s research using fifth and sixth grade students was extended in this study by using younger children and observing them outside of the classroom during lunch time. The sample consisted of 39 first grade students in a two-way language immersion program in a racially diverse classroom. The study lasted approximately 3 months. Both pre and post-observations, sociograms, assessments, and questionnaires were administered. The scores on the content assessments indicated that the English speakers generally outperformed the Spanish speakers. While the results indicated that the students did not bond as significantly with their Jigsaw teammates, as did Aronson’s sample, there were positive outcomes. Overall, students were highly motivated and demonstrated remarkable versatility in developing second language communication strategies.
Most public schools in the United States are composed of a diversified ethnic and racial population. In 1970, 70% of our nation's Kindergarten through 12th grade student body was white and 30% was non-white. It is predicted that by 2026, due to growing diversity, those percentages will be the exact inverse: white will be 30% and non-white will be 70% (Garcia, 1994). This continual trend towards ethnic and racial diversity will have both positive and negative impact on the social dynamics and academic achievement of students.

Some of the positive aspects include the opportunity to learn a second language and appreciate cross-cultural similarities and differences. The negative aspects include racial and ethnic conflict and the lack of student academic achievement. Racial and ethnic conflict is often the result of prejudices that have been formed or learned by children from their caregivers (Ehrlich, 1973). "If a child is exposed over a long period of time to one set of values or one way of doing things, he or she is likely to eventually come to view that as the natural way or the only way" (Farley, 1988, p.23). When children enter the educational system, they arrive with preconceived beliefs about other people who may look different, come from a different social class, or speak a different language than they do. These beliefs will influence their friendship choices.
Although students have opportunities for intergroup contact on the playground, while eating lunch, and in the classroom during free choice, usually they do not mix. Jonathan Freedman, a Pulitzer Prize-winning editorial writer for the San Diego Union Tribune, spent one year as a writing mentor working in classrooms in the San Diego City School District. He spent time in the classroom working with students of different ethnic groups and observed that although students shared and mixed inside the classroom, outside the classroom those same students gathered in separate areas (1998).

In the classroom, teachers generally assign seating to facilitate roll-taking, manage language differences, academic needs, or to control behavioral problems. A teacher may either group children by a common language or pair-up first and second language learners. A second language learner is a child whose first or home language is different from the language used during instruction. Because of assigned seating, children have limited opportunities to choose with whom they will work and play in the classroom. In addition, some teachers do not schedule free-choice often enough or for a long enough time in order for children to develop friendships. Free-choice is when students are given an opportunity to self-select from a variety of activities. In other instances, children are allowed free-choice only when their work is finished. Because some children work slowly or have difficulty finishing their work, they may not get to move
Consequently, teachers should allow students a structured opportunity to mix with children of different socioeconomic levels, academic abilities, and language differences. Just as ethnic and racial diversity may affect the social dynamics of students, diversity may also affect academic achievement (Woolfolk, 1993). Generally, schools with high ethnic and racial diversity have large academic gaps between their majority and minority students. There are many reasons for academic failure. It can be the result of how a student relates to the learning environment or how comfortable he or she feels in the classroom. Another cause of academic failure may be the student's relationship with the teacher. There may be some incongruities between a teacher's culture and a student's culture that inhibit a child's ability to excel (Delpit, 1995). For instance, middle and upper socioeconomic class parents relate to their children differently than lower socioeconomic class parents. Upper and middle class parents, "...talk more; give more verbal guidance; help their children understand the cause of events, make plans, and anticipate consequences..." (Woolfolk, 1993, p.165). This sort of verbal exchange mirrors how middle class teachers interact with their students, but a child who comes to school without this experience is at an academic disadvantage. A student may also fail due to the low expectations that some teachers may have for children of certain ethnic or socioeconomic groups. For example,
"...because low-SES [socioeconomic status] students may wear old clothes, speak ungrammatically, or be less familiar with books and school activities, teachers and other students may assume that these students are not bright" (Woolfolk, 1993, p.164). Additionally, and perhaps one of the most significant causes of academic failure, is the lack of motivation to learn. Unmotivated students do not achieve to their full academic potential.

This academic disparity is particularly evident in the large achievement gap between white and Hispanic students. For instance, California standardized tests administered in the spring of 1998 revealed that, "In third-grade reading, 70 percent of ... whites scored at or above the national average, compared with ... 43 percent of Hispanics" (Moran, 1998 p.B-1). Since World War II, the United States has been evolving into a technological society which requires a highly educated working force. Low-achieving students may have a high drop-out rate or may not advance into higher education. When Woolfolk studied the state of American prejudice between different races she discovered that, "... only 4 percent of the scientists, engineers, and mathematicians and only 6.8 percent of the teachers in the United States [were] either African-American or Hispanic-American..." (1993, p.171). Clearly, there is a connection between academic achievement and economic opportunities. Today more than ever, educators are challenged to discover ways to motivate Hispanic students to ensure their educational success.
One solution to closing the academic gap and improving the social dynamics between white and Hispanic students is the cooperative learning strategy known as Jigsaw learning. Jigsaw learning was developed by Elliot Aronson in response to ethnic conflict during classroom integration in the 1970's (Aronson & Patnoe, 1997). The original hypothesis of Jigsaw learning was that students would like school more, have higher self-esteem, and be more cooperative and less competitive than their peers after participating in structured cooperative learning that emphasized interdependence. Ultimately, the students would like their Jigsaw group mates more than their classmates (Aronson & Patnoe, 1997). Jigsaw teammates are assigned to work together in order to learn the content. In a Jigsaw classroom, students are taught to rely on each other in order to construct the learning rather than depending on the teacher for information. This interdependence can result in both friendship and higher academic achievement.

This study examines the ways that Jigsaw learning affects children in a racially diverse classroom. The focus of this study is on social dynamics and academic achievement. Nearly any type of subject matter can be adapted for use with the Jigsaw technique. When using Jigsaw, the class is divided into groups of five to six students. One member from each Jigsaw group studies with an expert group to learn a particular aspect of the topic and becomes an expert for his or her Jigsaw group. After becoming an expert on an assigned topic, each student
teaches the content to the other students in his or her Jigsaw group. Each teammate is an integral part of the group and each is equally valued for his or her contribution. The end result is that students experience positive social interaction while learning the content.

This study takes place in two first grade Language Academy classrooms in a public school located in North San Diego County. The Language Academy is a magnet program that uses a two-way language immersion model. The goal of a two-way immersion program model is "...bilingualism and biliteracy for language minority and language majority students" (Lessow-Hurley, 1990 p. 19). Bilingualism and biliteracy include the ability to understand, speak, read, and write in two languages (Padilla, 1982). Because the school is located in a predominately Hispanic neighborhood, the Language Academy was established in 1989 to encourage Anglo parents to enroll their children in the school to create a more ethnically balanced population. With this plan the school is evolving towards a more ethnically balanced population, but the children are not integrating on the playground, at lunch time, or during free-choice time. In addition, there is an academic gap between the Anglo and Hispanic students.

This study looks at Jigsaw as a possible solution to improving both the social and academic dynamics in a racially diverse elementary school. This research builds upon the peer tutoring research done by Aronson and Patnoe (1997) on Jigsaw learning. The results of their studies
indicate several benefits. Children in Jigsaw classrooms like their peers and school better, have higher self-esteem, have higher academic mastery, and can empathize with one another more than their peers in traditional classrooms (Aronson & Patnoe, 1997). This study compares the academic gains of English and Spanish speaking students and the friendship alliances resulting from participation in Jigsaw. This study extends Aronson and Patnoe's research in two ways. First, although they do not recommend the use of Jigsaw learning prior to the fourth grade, this study adapts the Jigsaw technique for use with first grade students. Secondly, their research focuses on peer interaction inside the classroom, while this study looks at peer interaction both inside and outside of the classroom.
First grade teacher Mrs. Smith had spent hours of planning time preparing to teach her students an exciting integrated unit on frogs. She had collected literature, charts, live samples, computer programs, videos, music, and poetry about frogs. Her materials were grade level/age appropriate, she was thoroughly knowledgeable about the subject, and was looking forward to presenting the frog unit to her students. Now the question: Did her students learn and master the objectives of the unit? The answer was: only if they were motivated to learn. Good pedagogy required more than teacher preparation and appropriate materials. The deciding element was the students' motivation to learn. This paper looked at the social dynamics and content mastery by first and second language learners using Jigsaw, a cooperative learning technique, as a means of motivating students to learn.

It would be wonderful if all of Mrs. Smith's students arrived to class motivated to learn, but realistically they did not. Some might have lacked academic confidence, some did not have the ability to concentrate on the task at hand, while others believed that school was boring. There may have been cultural or gender issues that interfered with a student's desire to learn. Some students may have experienced failure in previous learning situations yet may have been interested in learning about frogs, but they lacked the social skills needed for engaging in activities that extended their learning or expanded their schemata by
or through cooperative learning. Even though each student had arrived with a different predisposition to learn, all students needed to be motivated to learn.

According to Woolfolk, (1993 p.369) an educational psychologist at Rutgers University, “...motivation to learn is a complex collection of beliefs and behaviors” (1993 p.369). These beliefs included the idea that hard work and personal application would improve knowledge, as well as intrinsic factors such as interests and a desire to learn. A learner must have recognized the satisfaction from accomplishing challenging goals. The behaviors of a motivated learner included “...thoughtful, active study strategies, like summarizing, elaboration of the basic ideas, outlining in your own words, and drawing graphs of the key relationships...” (Brophy, 1988 in Woolfolk, 1993, p.369). The two main goals of a teacher were “...to get students productively involved with the work of the class...and to develop in...students the trait of being motivated to learn” (Woolfolk, 1993, p.370).

One factor that influenced motivation was self-esteem. According to Coppersmith (1967), self-esteem was how each person measured his or her self-worth. Cooley’s (1992) explanation of self-esteem made a distinction between an individual’s perception of how others perceived him or her and how the individual felt about himself or herself. Mead (1934) referred to the “outer or external” aspect of self-esteem as the social comparison process which stemmed from the outside world. In contrast, the term “inner or
personal" was used to refer to personal experiences and fulfillments as well as intelligence (Coppersmith & Feldman, 1974; Franks & Marolla, 1976). Although these were described as two distinct dimensions of self-esteem, they were thought both to overlap or interact with each other. In a school setting, the interaction between the two dimensions are evident in a child’s interpretation of the feedback or treatment he or she received from both the teacher and his or her peers. For instance, a child might have been hesitant to answer a question if he had been laughed at or ridiculed by his peers. He might have interpreted the laughter as confirmation that he was not smart or capable of finding the right answer. That experience would have a negative effect on both his inner and outer self-esteem.

In addition to consideration of student self-esteem, teachers needed to be aware of the variety and scope of student learning and cognitive styles. “Learning style preferences are individual preferences for learning environments and do not indicate intelligence” (Woolfolk, 1993, p.131). Shuell (1981, p.46) described learning styles as “…preferred ways that different individuals have for processing and organizing information and for responding to environmental stimuli” (1981, p.46). Learning style preferences included quiet versus noisy work areas, individual versus group projects, structured versus unstructured activities, and visual versus verbal learning. Snider (1990, p.53) advised teachers that, “People are
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different, and it is good practice to recognize and accommodate individual differences" (1990, p.53).

Cooperative learning tasks can be arranged to give students choices in how and when their work is to be done. Group preference was satisfied through the nature of cooperative work and individual preferences were built in through individual assessment.

Another consideration to ensure student motivation was the importance of authentic and meaningful tasks. According to Freeman and Freeman (1991), learning in classrooms was generally future oriented. Too often teachers told students that the reason they must learn something is because they will need it in the following grade, in high school or even later in life! "The problem with this [process of] future orientation is that human beings usually don’t learn things until they see a need for them" (Freeman & Freeman, 1991, p.147). An example of an authentic and social task would be writing to a pen pal. For the student, learning how to write a letter became a meaningful task because they needed to know how to write a letter in order to communicate with a real person.

The climate of a classroom affected student motivation. The climate of a classroom was the setting for learning which included tasks, performance goals, and task evaluation. Doyle (1983) found that most students worked for the goal of grades not for the goal or joy of learning. High achieving students were generally grade-orientated while low achieving students worked just to get the work
done even if they did not completely understand the task. (Anderson, et.al., 1985) In an effective classroom, students worked with a blend of getting the job done while they enjoyed the learning. Research by Morris (1988) found that each task had an optimum level of arousal. Woolfolk defined arousal as "... physical and psychological reactions causing a person to be alert, attentive, [and] wide awake" (1993, p.342). For simple tasks students needed a high level of arousal for optimal performance, while complex tasks required a low level of arousal for optimal performance. When a teacher expected students to complete complex tasks, they were more efficient in an anxiety free classroom climate (Hansen, 1977). Two causes of anxiety were the subsequent consequences of personal failure and competition between students (Wigfield & Eccles, 1989). Successful teachers had high expectations and reinforced the idea that mistakes were only opportunities to learn. Optimal results were achieved when the work was challenging but reasonable, and the teacher was patient and encouraging (Cliff, 1990). Properly structured cooperative learning situations will consider all of these factors that affected the classroom climate.

Traditionally, public school classrooms were teacher centered. In a teacher centered classroom, the teacher was the source of all knowledge and the students were the passive recipients. This was and still is especially true in classrooms with second language learners. This was because the teacher was seen as the target-language role
model. In a learner centered classroom, the focus was placed on drawing from the students’ strengths as a means of promoting student success. This rationale tied in with Dewey’s belief that the child was the starting point, the center, and the end.

The opposite of a teacher centered classroom was a student centered classroom. In a student centered classroom, students actively participated in their own learning and contributed to the learning of their peers. One strategy employed in this type of classroom was cooperative learning. Cooperative learning was a strategy that had been proven to enhance the social interaction between linguistically heterogeneous groups (Faltis, 1993 & Johnson, 1994). Cooperative learning demanded and encouraged interdependence among the participants because students had common group goals and individual objectives.

In particular, second language learners felt more comfortable working in a small cooperative group because their affective filter was lowered. The affective filter was a metaphor used by Krashen (1982) to describe the comfort level of a learner. When a learner was anxious or uncomfortable, they filtered or blocked out incoming information. When students felt relaxed and comfortable, they lowered their filter and were more receptive to learning. They were able to build content knowledge and social skills while accomplishing objectives that would otherwise have been beyond their ability due to lack of language.
There were several factors to consider when setting up cooperative groups. First, the teacher considered the needs and abilities of the students. Needs and abilities were evaluated on the basis of language, gender, and academic ability (Rigg & Allen, 1989). If personality conflicts arose or the assigned task became too difficult, the teacher should have been flexible in adjusting tasks and rearranging groups. These considerations were important to ensure student motivation. It was more likely that students would maintain their motivation if their work was purposeful and they had the confidence that they could successfully complete the assigned task (Genesse, 1994).

One successful cooperative learning technique, called Jigsaw, was developed by Elliot Aronson in the 1970's in response to ethnic conflict due to school desegregation. It was originally designed to improve race relations between students. In the 1970's, Austin, Texas was residentially segregated and students had to be bused in order to desegregate the schools. The result was extreme racial conflict and physical violence. Aronson, a social psychologist, was a professor at the University of Texas and also a father of four children in elementary school. He considered short term crisis intervention strategies, but ultimately developed a long term prevention plan. He began with fifth and sixth grade students because he believed they were less likely to have ethnic and racial prejudices. The long term prevention plan developed into the cooperative learning technique known as Jigsaw.
When he originally conceived Jigsaw learning, Aronson's (1997) hypotheses were that students that participated in Jigsaw learning would, "... like school more, show a greater increase in self-esteem, show a decrease in feeling of competitiveness, [and] believe more that they can learn from other children" (p. 87). To test the validity of these hypotheses, Jigsaw students and control group students were questioned throughout the course of the study to see how they liked their peers. The results showed that the Jigsaw technique caused a significant increase in student self-esteem, motivated students to learn, and that students liked their peers and school more in comparison to their control group peers.

"In Jigsaw, each member of the group was given the chief responsibility for learning and teaching a specific portion of the unit or task. Students had assigned roles and responsibilities for specific assignments within groups and across groups. Each member shared his expert knowledge with others in the group" (Pérez & Torres-Guzmán p.96, 1992). The Jigsaw technique satisfied the need to accommodate the differences in student learning styles. Group learning preferences were satisfied by the social interaction of Jigsaw groups. Individual learning preferences were accommodated by using individual assessment to measure content learned.

Jigsaw learning adapted well with topics that emphasized reading and comprehension such as social studies, science, history, and geography. For example, a
social studies topic such as the life of Cesar Chavez could be adapted to Jigsaw learning. One expert group might be responsible for his early years, another for the events that led up to his political beliefs, another for his efforts in unionizing farm workers, and the last group might be responsible for the results of his life work. Learning the information becomes very meaningful to the students because they know their peers are depending on them for the information.

One important benefit was that all members of the team had equal value and status within the group regardless of their academic or social status in the classroom. Each member had the responsibility to learn a portion of the subject matter and shared it with their team members. This type of interaction created a student centered classroom. Students actively participated in their own learning and contributed to the learning of their peers. The teacher became the facilitator of learning instead of the source of instruction. Jigsaw created a motivating classroom climate because students shared responsibility for learning the task and they supported each other to accomplish the goals.

The teacher assigned heterogeneous groups according to academic achievement, gender and race. Team members were not allowed to self-select teammates because the goal was to not only learn content, but to give the students an opportunity to work with students with whom they did not already have a social alliance.
There were some difficulties with using Jigsaw techniques. Absences, conflicts between team members, rotation of team members and the difficulty of dividing the topic into workable sections were some of the difficulties found when implementing Jigsaw. In classrooms where the majority of students were slow learners, teachers had difficulty in creating academically balanced teams (Tierney, et. al, 1995). One other difficulty was that not all children in a classroom spoke the same language (Aronson, Bridgeman, & Geffner, 1978). Language differences created barriers to communication. Another difficulty was that some children preferred to work individually and resisted cooperative learning situations.

There were several profound benefits resulting from using Jigsaw techniques. Slavin's (1983) research found that students who participated in Jigsaw groups were motivated to learn and felt more positive about themselves. Another benefit was that group work, such as that in Jigsaw, helped second language learners learn content in context while acquiring language skills (McGroarty, 1993). Research done by Freeman & Freeman (1994) supported the theory that we learn by doing. In their study people learned to speak a second language by speaking that language. In language classes where students were provided with the opportunity for social interaction, students improved their language skills. Without the social interaction, students learned to read and write in a second language, but were weak in speaking and comprehension.
Aronson & Patnoe (1997) noted five other benefits: 1) students liked their Jigsaw group mates more than other peers; 2) students liked school better and had fewer absences; 3) students' self-esteem improved; 4) students academically out-performed students in traditional competitive classrooms and; 5) students learned how to empathize with others.

Numerous studies have documented that academic success resulted in high self-esteem which in turn contributed to academic success. (Brookover, W. B., et.al 1964, Covington & Beery, 1976, Purkey, 1997). Three hundred fifth and sixth graders participated in a study to verify academic achievement of students learning with Jigsaw. The students were divided into eleven classrooms: six Jigsaw classrooms and five control classrooms. While the Anglo students in all classrooms performed equally as well on content testing, the real gains were made by minority students who performed much better than their control peers (Lucker, et. al. 1977). These same results were successfully duplicated by Slavin (1977) and Garibaldi (1977).

This reinforcing cycle of high academic achievement and high self-esteem was illustrated by the story of one student in Aronson's original study in 1977. The boy, Carlos, was not fluent in English, hated school, and disliked his classmates. Initially, his Jigsaw group ridiculed and teased him because he had difficulty expressing himself. Carlos was a classic example of how
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one’s affective filter can affect learning. Because he felt uncomfortable at school, he failed to learn. The teacher intervened and reminded the group that they needed to cooperate and depend on Carlos or they would miss a large portion of the material they were expected to learn. The group dynamics shifted to one of support and encouragement rather than contempt and derision. This support and encouragement helped Carlos lower his affective filter and became a productive and willing member of his team. Years later, Carlos wrote to Aronson and told him that the Jigsaw experience completely changed his attitude towards school and his peers. The resulting boost to his self-esteem empowered the boy who eventually went on to Harvard Law School. Carlos’s story exemplified the cycle of self-esteem and high academic achievement.

The Supreme Court decision for Brown vs The Board of Education (1954) was meant to equalize the public school system for minority students. Unfortunately, rather than raising the performance of ethnic children and reducing prejudice, in many cases, it exacerbated the problem (St. John 1975: Miller, 1977, & Woolfolk, 1993). Despite the efforts of desegregation, prejudice was not erased and students continued to perceive themselves as less than equal. Minority students were unable to compete with Anglo students who came from more affluent homes and better schools. Minority students placed in competitive learning environments placed low academically and had higher drop out rates than their Anglo peers.
Numerous studies compared the cooperative and competitive behavior of Anglo-American and Mexican-American children. In games measuring cooperative and competitive behavior, Mexican children were the most cooperative, Mexican-American were the next, and Anglo-American were the least. In studies of cooperative behavior, 4 to 5 year old children were far more cooperative than 7 to 9 year old children (Kagan, & Madsen, 1971; Kagan & Shapiro 1970). It appeared that younger Mexican-American children would be more adept at learning in a cooperative learning environment rather than a competitive environment. In schools where competitive structures were substituted with cooperative structures, studies found positive attitude and academic gains across ethnic groups (Weigel, Wiser, & Cook, 1975; Blanchard et al., 1974; DeVris & Slavin, 1976).

The early negative effects of desegregation proved, that simply putting students together did not necessarily result in positive social interaction (St. John, 1975 & Woolfolk, 1973). Without accompanying educational guidance on human relations and differences, the students were not able to deal with ethnic diversity. One program, *A World of Difference*, was developed by the Anti-Defamation League in 1985 to provide students with opportunities to learn about cultural diversity. This program was developed in response to international bigotry and prejudice. Its focus provided children with many opportunities to learn about and value themselves as well as others before they began to deal with more complex issues such as discrimination and
According to one of the principles of *A World of Difference*, prejudice was learned and can be unlearned (1994). If students were not educated in recognizing and handling prejudice, their beliefs would intensify over time. The key in reducing student prejudice was dependent on consistent and repeated educational opportunities beginning in elementary school and continuing through adulthood.

In Aronson & Patnoe’s (1997) study, team building preceded the Jigsaw lessons in order to provide the students with the opportunity to realize that each team partner was an equally valued member. Through the process of team-building games and activities, it was hoped that the students would learn how to work together. Team building was only the beginning of breaking down the students’ prejudices. Despite participating in the team building, Carlos’s team members obviously did not value him as an equal partner until the instructor intervened and reminded them that they could not succeed without his contribution to the group. This case exemplified the need for continued education to unlearn prejudice.

In conclusion, the research strongly pointed to the possible success all learners had when they were allowed to learn in a student-centered classroom in which cooperative learning strategies were employed. Besides learning content, students developed social skills in a cross-cultural setting. Among the many cooperative learning
strategies, Jigsaw was shown to be effective for students of varying academic levels and mixed ethnic groups. Jigsaw appealed to students with different learning styles and also aided the teacher in maintaining a healthy and positive learning environment. Despite efforts to desegregate public schools and reduce prejudice and bigotry, poor ethnic relations have continued to be endemic in our country. Education was proven to be one effective solution in changing the way people relate to each other in a multicultural society.
Aronson and Patnoe (1997) developed a cooperative learning technique called Jigsaw in order to improve race relations between students. They used fifth and sixth grade students in their original study because they believed that racial prejudice began at that age. They measured how students felt about themselves, their peers, and their school work. They also measured and compared the academic success of minority and majority students against the scores of a control group. They did not advise using students younger than fifth or sixth grade in Jigsaw learning because their original concept required that students be able to independently read content material.

The current investigation extended Aronson and Patnoe's (1997) research in two ways. First, this study adapted the use of Jigsaw with first grade students. The teachers modified the way the students acquired the content. They taught the content to small groups of students because many of their first graders were beginning readers and were unable to read independently.

Second, Aronson and Patnoe (1997) interviewed and observed students inside the classroom. Students were asked how they felt about school in general and how well they liked their peers. The current study observed the students both inside the classroom during unstructured activities and outside the classroom during lunch time. This was done in order to document if the positive
interactions in the classroom during Jigsaw affected the students' friendship choices outside the classroom.

Teachers made pre and post observations of the students both inside the classroom during free-choice activities and outside the classroom during lunchtime. Students were asked to choose and draw three friends before and after the study. These drawings became the class sociogram, which documented existing friendships. According to Webster's New World Dictionary, a sociogram is "...a diagram designed to indicate from answers to sociometric questions how individuals in a group feel toward each other" (Neufeld, 1988). In addition, students were interviewed by a bilingual independent interviewer to establish how they felt about their peers, school, and school work before and after the study using a Likert-type scale. A Likert-type scale is "...a scale that uses forced choices of response to statements and questions; for example, 'Always,' 'Sometimes.' or 'Never'. Each response is assigned a value; a value of 1 represents the least positive response" (Hittleman & Simon, 1997, p. 382). Students were given pre and post yes or no tests, and fill-in tests to measure content knowledge.

The overall focus of this study examined the effects on students after participating in a cooperative learning Jigsaw experience. The primary goal was to improve the amount of social interaction in a racially diverse classroom. The secondary goal was to boost academic achievement of all the children, but in particular Hispanic
II. Subjects

Participants and Setting

The participants in this study were from an elementary school located in North San Diego County. The subject population consisted of 39 students from two first grade bilingual classrooms. The language model for the classes was a two-way immersion program using English and Spanish. The goal of a two-way immersion program model is "... bilingualism and biliteracy for language minority and language majority students" (Lessow-Hurley, 1990, p. 19). Language arts placement was determined by parent request rather than by the student's first or native language. Language arts instruction was integrated with science and social studies. Homeroom activities such as calendar, lunch count, attendance, reading the schedule, and math were taught using English one week and Spanish on the alternating week. Classroom A teacher taught language arts in English, and Classroom B teacher taught language arts in Spanish. During this study both teachers taught the content of the Jigsaw lessons primarily in English. When necessary, teachers used Spanish to ensure comprehension.

All the students from both classes were included in this study. Parents were asked to sign a Parental Permission Form. The purpose of the project was explained to the parents, and they were given the option to refuse permission to have data about their child published.
Parents were told their children would not be videotaped, would not be compared with other children, nor would their names be used in the published results.

Classroom A. Classroom A consisted of 10 boys and 9 girls. Seven students were Hispanic and 12 were Anglo. Three of the Hispanic students received language arts in Spanish while the other 4 students received language arts in English. One of the Hispanic girls was repeating first grade. Ages ranged from 6 years 3 months to 7 years 11 months. Classroom teacher A had a bilingual teaching credential and had been teaching for five years.

Classroom B. Classroom B consisted of 12 boys and 8 girls. Fifteen students were Hispanic and 5 were Anglo. Twelve of the Hispanic students received language arts instruction in Spanish while 3 students received language arts instruction in English. One Hispanic boy had repeated Kindergarten, had communication and articulation problems, and spent four hours per week working with the resource teacher. Ages ranged from 6 years 3 months to 7 years 7 months. Classroom teacher B had a bilingual teaching credential and had been teaching for eight years.

Academic standing was based on reading stages. The stages ranged from 1 to 4 and were based on the difficulty of the text (see Appendix A for samples of each reading stage).
Table 1  Reading Stages Classroom A

<table>
<thead>
<tr>
<th>Stages</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>11</td>
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</tbody>
</table>

Table 2  Reading Stages Classroom B

<table>
<thead>
<tr>
<th>Stages</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>

Sample Selection

The topic of this Jigsaw study was ants. This study topic was divided into four sections: habitat; body structure; behaviors; and prey. Five students were assigned to each expert study group. Four students were assigned to each Jigsaw group. Each Jigsaw group consisted of a mixture of students based on reading stages, dominant language, gender and existing friendships based on class sociograms. Best friends were separated so that students had the opportunity to build new friendships. Teachers used a matrix format to assign students to each group (see Table 3).

The students' names were converted to a number-letter code. The students in classroom A were assigned numbers 1
through 19, and the students in classroom B were assigned numbers 20 through 39. Each number was followed by either E for English expert, or S for Spanish expert to ensure confidentiality of subjects. Students were assigned to a Jigsaw group. They were not randomly chosen or allowed to self-select in order to give them experience in working with children of different gender, academic levels, and dominant language.
Table 3  Sample Matrix Format For Jigsaw Topic: Ants

<table>
<thead>
<tr>
<th></th>
<th>Habitat</th>
<th>Behaviors</th>
<th>Body Structure</th>
<th>Prey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Group B</td>
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<tr>
<td>Group C</td>
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<tr>
<td>Group D</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Group E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
III. Instruments

Reading Stages

Both teachers used running records to determine students' reading levels in their language arts classes. A running record is "... a shorthand procedure for making observations of strategies students use when they read orally" (Leslie & Jett-Simpson, 1997, p. 96). These reading assessment levels were used to determine academic standing in the class and were considered when the teachers made up the Jigsaw group assignments. Each group was composed of students of various reading levels to create a balanced mixture of skills and abilities (see Tables 1 and 2 for the range of reading scores in each class).

Teacher Observations

Each teacher made twenty student observations. Five were made during lunchtime and five during free-choice activities inside the classroom before the study began and the same amount after the study was completed (see Appendix B). Classes A and B walked together to the lunch area. Students ate their lunches at picnic tables under a covered awning. Once all the children were seated, the teacher circulated through the lunch area and recorded the names of the students sitting together at each table. Free-choice activities included: floor-sized puzzles, linker building cubes, pattern blocks, wooden building blocks, stuffed animals, and sorting objects such as buttons and shells. The children were allowed 20 to 30 minutes of free-choice
time. During free-choice time, teachers circulated through the room and recorded the names of children playing together. They also noted whenever a child moved from one activity to another. Observations documented with whom children were sitting, working, or playing in order to determine existing class friendships.

Class Sociogram

Prior to the study, each student was asked to pretend that he or she was having a sleep over at his or her house. They were told that they could invite three friends from their homeroom to spend the night. They were provided with a composite picture which included the names of their classmates. Students drew three friends and wrote their names on a class sociogram sheet (see Appendixes C and D). The composite picture with names was given to the students so that they could correctly write the names of their classmates without revealing who they were drawing by talking to each other or walking around the room. Students were asked not to tell who they were choosing to prevent anyone from feeling excluded.

After the Jigsaw lessons and assessments were completed, students were again asked to do this same sociogram activity. Pre and post sociograms for each student were compared to determine any changes in friendships that resulted from the Jigsaw group experience.
Peer Interaction

Likert-Type Scale Attitude Questionnaire

Students were asked six questions that revealed how they felt about school, schoolwork, and their peers before and after the Jigsaw lessons (see Appendixes E and F). A bilingual independent interviewer conducted the interviews. The independent interviewer conducted the interviews so that the students would not be influenced by the presence of the teachers.

Lesson Plans

Eight lesson plans (see Appendixes G, H, I and J) were prepared for the topic of ants: two for habitat, two for prey, two for body structure, and two for behavior. Lesson plans included objectives, materials needed, literature, preparation, second language considerations, presentation steps, closure, and instructions for experts.

The Jigsaw groups completed their bonding and team building activities prior to the Jigsaw content lessons. The Jigsaw activities were conducted in the afternoon. Each student was given a badge to wear that designated his or her expert assignment. These badges facilitated calling experts to their study groups with the teachers and helped to remind the Jigsaw team members of what each person was in charge. The teacher met with one expert group per day. While the teacher met with the expert group, the remaining students worked on math practice sheets at their desks. Each expert group met with the teacher for two consecutive days for approximately 20 minutes per lesson. At the end
of each lesson, the expert group reviewed and practiced their lesson for approximately five minutes before presenting it to their Jigsaw groups.

When the experts returned to their Jigsaw groups, they taught their content lesson and assisted their teammates in assembling or completing the lesson's project. The Jigsaw groups were allowed twenty to twenty-five minutes to complete the lesson. If an expert could not recall information or instructions, he or she was encouraged to consult with another expert rather than the teacher.

Study Sessions

After all the lessons had been presented, the teacher met with one expert group per day to review their part of the topic. The teacher gave each expert group a list of study questions. The group practiced reading the questions and recalling the answers. The experts returned to their groups and quizzed their team members to review for the final assessment. Before the final assessment, the students had two additional study days. On the first study day, the experts took turns asking questions from their study sheets. On the second day, the students independently reviewed all the information from their ant portfolios.

Assessments

Two pre and post assessments were given to the students to measure content knowledge about ants. Tests
were conducted in either Spanish or English according to the reading language of each student. The questions were extracted from the objectives of the ant lessons. Teachers considered the potential difficulty of Spanish language students having to learn scientific vocabulary in English. Questions were formatted using common vocabulary that most first graders would already know. The first assessment used a yes or no format (see Appendixes K and L). The second assessment used a fill-in format (see Appendix M and N). Teachers read the questions to the students in a whole group setting. The tests were administered using only one language at a time. During this time, students not taking the test worked on independent projects.

IV. Design and procedure in qualitative research

Pre-Observations

Each teacher made five observations during free-choice activities and five observations during lunch time.

Pre-Likert-Type Scale Attitude Questionnaire

A bilingual independent interviewer gave each student the attitude questionnaire before the classes began the Jigsaw activities. The attitude questionnaire measured how students felt about school, school work, and their peers (see Appendix E and F). This procedure was repeated after the conclusion of the Jigsaw activities.
Pre-Class Sociogram

After the first attitude questionnaire was completed, students were asked to draw the first class sociogram (see Appendix C and D). At the end of the study, the students completed a follow-up sociogram.

Pre-Assessments

Teachers read the yes and no and fill-in assessments to the children to establish prior knowledge of the content (see Appendixes K, L, M and N).

Jigsaw Explanation To The Students

Students were told they were going to learn and teach each other about ants using a fun and exciting new way. They were given a general explanation of the Jigsaw procedures. It was explained that they would be working closely in learning teams. Jigsaw assignments were posted and the students moved their desks together according to their group assignment so that Jigsaw groups could bond and work together.

Team Building

Team building activities were implemented before the curriculum material was studied so that group members would feel comfortable with their team. Three lessons from A World of Difference Institute (Mattenson, et.al., 1994) were incorporated as part of the team building experience. On the first day the students were guided through the lesson, People Are Different to create an awareness and
The appreciation of human differences (see Appendix O). On the second day the students were guided through the lesson **Making Judgments** to help the students become more receptive and less judgmental towards each other (see Appendix P). On the third day the students were guided through the lesson **Words Can Hurt** in order to give them skills to respond in a positive and constructive way to hurtful words and actions (see Appendix Q). The three team building lessons were given first, so that students could practice the social skills they would need for group work.

On the fourth day, the students did an exercise called **Group Picture**. The goal was to illustrate how everyone in the group could contribute to a common product. The groups was asked to draw a human face. Each student drew only one part of the face and then passed it to the next member in the group. This process was continued until the face was completed. Then they were asked to do a second drawing but this time they were not told what to draw. The purpose of the drawings was to help the group enjoy the results of a collective creative experience.

On the fifth day they were asked to introduce themselves by name all at the same time. This was done to point out the importance of turn taking and listening to one another. Then they were given a tray of the food supplies to make a snack called **Ants On A Log**. Before receiving the food, students were instructed to discuss with their group how they would manage passing out the supplies, making the snack, and cleaning up.
On the sixth day, Jigsaw teams played relay races to build team spirit and to practice encouraging and supporting each other. "Relay races can help children learn to cooperate since they demand that teammates follow rules and directions" (Pangrazi & Dauer, 1992, p. 549). The teachers instructed the students to join with their Jigsaw groups. The teachers modeled how to do each relay and encouraged the students to cheer for and support their teammates. The relays included lane relays using different locomotor movements such as hopping, skipping, and galloping. Other relays included beanbag pass, catch-and-fetch relay, and beanbag balance.

The Jigsaw Lessons

On the seventh through the fourteenth day the teachers presented the Jigsaw lessons to the expert groups. The teachers met with one expert group per day. The Jigsaw lessons were done in the afternoon during homeroom time. At the end of each Jigsaw session, the students stored their finished projects and information sheets in a personal ant portfolio.

Study Sessions

When all of the lessons were completed, students used the contents of their ant portfolios and the study questions to study for and quiz each other before they took the post-assessments.
Post-Assessments

The yes and no and fill-in post-assessments were given on two separate days.

Post-Attitude Questionnaire

After the post-assessments were given, the independent interviewer asked each student to respond to the attitude questionnaire.

Post-Class Sociogram

The students were again asked to imagine that they were having a sleep over at their house. They followed the same instructions as the first time, drawing and naming three friends using the composite class picture.

Post-Observations

Each teacher made five observations during free-choice activities and five observations during lunch time.
Limitations

The results of this study are limited to first-grade children in a two-way language immersion program using English and Spanish. When reading the results of this research, several considerations should be noted. First, the students spend 80% of the day using one language during language arts and spend only 20% of the school day with their Jigsaw team members. During the time allotted for Jigsaw learning, children and teachers use two languages. Most of the Spanish experts have a high level of oral English. Most of the English experts have minimal Spanish speaking skills and a few Spanish experts have minimal English speaking skills. For some of the students this is a problem when they present their lessons. Although several children compensate using creative communication strategies, there remains an information breakdown between some of the students.

Another limitation is that the time frame for the study is too short. Because only 20% of the day is spent on the study, time limits content mastery of the subject. The expert Jigsaw groups need more exposure, practice, and review of their materials before making their presentations to their Jigsaw groups.

Although Jigsaw group study time is built in, first graders lack the study skills to work independently in a non-teacher directed study session. Reading ability limits some of the students from processing and transmitting all
The students lack the vocabulary to correctly answer the fill-in questions in both the pre and post-assessments. A more appropriate test includes a word bank from which students select the answers.

The independent interviewer finds that the questionnaire using a Likert-type scale is confusing to the first graders. The format of the questionnaire requires that students evaluate their feelings about school, school work, and their peers by answering either Never, Sometimes, or Always. The students are unable to answer in this way. The interviewer finds that she has to preface each question by saying... “Do you never like school, do you sometimes like school, or do you always like school?” Several children give answers to the questionnaire depending on their feelings at that moment. For instance, one student who states that he always likes school on the pre-questionnaire, answers the post-questionnaire negatively on the same morning he is apprehended with a toy squirt gun. He is angry about having the gun taken away and his answers may reflect his feelings about school at that moment.

In addition, since the teachers combine the classes so often for parties, videos and assemblies etc., the students do not have a clear concept of the meaning of the word “homeroom”. The interviewer finds it necessary to clarify the word “homeroom” to each student.

In order to form heterogeneous groups, each group contains at least one student with below grade level
academic abilities or with speech problems. The scores of these students in most cases lower the overall scores and gains of the Jigsaw groups. For some students, the inability to read and verbally express themselves limits the amount of information they can processes and give their team members.

Finally, there are some children whose behavior interferes with the effectiveness of the group. One student in particular, 26 S lacks concentration, chatters when someone is speaking, is disrespectful with adults and peers, and is mean tempered. His group struggles to study or learn the information and one of his group members asks the teacher to remove 26 S from the group.

**Free Choice Observations**

For the purpose of clarification, the term “English expert” refers to a student who receives reading instruction in English and the term “Spanish expert” refers to a student who receives reading instruction in Spanish. In classroom A, during all of the free-choice activities, the three Spanish experts generally stay together but their group always includes from one to five English experts. The only exception is during the very first free-time observation when the three Spanish experts organize a game and play exclusively together.

In classroom B, the majority of the Spanish and English experts generally mix during both the pre and the post free-choice activities. However, during nearly every
observation, there are small contingents of students that form exclusive groups of either Spanish or English experts. The makeup of the groups changes from time to time and it appears that none of the students deny their peers entrance to the groups. Two English experts, 25 E and 29 E, never play by themselves or in an English only group. This appears to happen because both of the girls have a strong friendship bond with three female Spanish experts. All three Spanish experts are fluent in English which appears to serve as a bridge in forming friendships with English experts. In contrast is 37 S, who has very limited English skills. She generally plays in Spanish-only groups with the exception of two instances when 25 E is present.

In conclusion, there were few changes in friendship choices either before or after the Jigsaw experience.

Lunchtime Observations

Classroom A and B students walk to the lunch arbor together. Teachers dismiss the students who bring their lunches from home first. The remaining students line up to get their lunches from the cafeteria. While student groups tend to change during the free-choice activity time, during lunch time, the majority of the students eat with the same friends each day. There are four groups of five or more students. One group consists of primarily English-expert boys with at least one or more Spanish-expert boys. Another group consists of primarily English-expert girls with at least one or more Spanish-expert girls. The third
group consists of primarily Spanish-expert boys with one or more English-expert boys. The fourth group consists of three or four Spanish experts. Students not included in these four groups eat by themselves or with a partner from another first grade class.

In conclusion, the majority of the students continue to sit with basically the same companions before and after the Jigsaw experience. It appears that fourteen out of thirty-nine students choose to eat by themselves at least once during the lunch observations. Of those fourteen, three students, 33 E, 39 E, and 22 S choose to eat by themselves at least once but not more than three times during the pre and post-observations. Student 33 E, one of the students who eats lunch alone, is one of the students who receives the most votes in the pre and the post-sociogram, indicating he is very well liked by his classmates. One of the other students, 39 E who eats by himself, receives no votes on either the pre or post-observation.

Class Sociograms

In Classroom A, the pre-Jigsaw sociogram reveals that three English experts, 12 E, 10 E, and 15 E appear to be the most popular. In the post-sociogram, 12 E and 15 E both gain one vote each, while 10 E maintains five votes. Only 2 E does not receive even one vote in the pre-sociogram. 2 E receives one vote from 1 E in the post-sociogram. 1 E is not in the Jigsaw group of 2 E and it
appears their friendship develops independently of any Jigsaw experience. The spread of the votes in the pre and post-sociograms stays basically consistent.

In the post-sociogram, only four of nineteen students choose between one and two friends to spend the night that are from their Jigsaw groups. Two of those four choices are the same choices as in the pre-sociogram.

Although each student chooses three students to spend the night, generally only one of three possible students reciprocates the vote. In the pre-sociogram, four students do not receive a reciprocating vote. In the post-sociogram, two students do not receive even one reciprocating vote. Of those two students, 6 E does not receive even one vote in the pre or post-sociogram.

In summary, there are four notable observations in Classroom A. First, the popular students remain popular irrespective of the Jigsaw experience. Second, 2 E, the student who is excluded in the pre-sociogram gains one vote. Third, most students receive at least one reciprocating sleep over vote, while 6 E and 3 S do not receive even one reciprocating vote in the post-sociogram. Finally, four students choose one or more students to sleep over that are in their same Jigsaw groups. Of those four, two are chosen in the pre-sociogram. Only two students appear to gain some popularity indicating Jigsaw has limited effects on new friendships in classroom A.

In Classroom B, the pre-Jigsaw sociogram reveals that two English experts, 29 E and 33 E receive six or more
votes. One English expert and two Spanish experts do not receive even one vote. The remaining students receive from one to five votes. The post-Jigsaw sociogram reveals that 29 E gains an additional four votes, 33 E loses two votes and a Spanish expert, 32 S gains three votes. Of the students not receiving any votes in the post-sociogram, 39 E again does not receive any votes, while the other two Spanish experts receive at least one vote. One female Spanish expert, 37 S, goes from three pre-votes to 0 post-votes. Seven students reciprocate each other during both the pre and post-sociograms. One of those students, 30 E, reciprocates two friendships during both the pre and post-sociograms. Three students, 39 E, 26 S, and 37 S do not receive any reciprocal votes during either the pre or the post-sociograms. All of the remaining students receive at least one or more reciprocal votes during the pre and/or post-sociograms. In the post-sociogram, eight students choose a friend to spend the night that is from their Jigsaw groups. Only two of those eight choices are the same choices in the pre-sociogram.

In the summary of Classroom B pre and post-sociograms, there are four notable observations. First, the two most popular students remain popular and one Spanish expert, 32 S, moves up in popularity. Second, 39 E, is not chosen during the pre or post-sociograms. Third, the classroom votes on the post-sociogram show more of an even spread than the pre-sociogram. Finally, it appears that six new friendships develop as a result of the Jigsaw experience.
Questionnaires

In classroom A, there are 19 students. Four students like school more after the Jigsaw experience and two students like it less. Two students are happier in their homeroom after the Jigsaw experience and six were less happy. Six students were less bored after the Jigsaw experience and none were more bored. One English expert plays more with friends that speak Spanish after the Jigsaw experience and three play less often. One Spanish expert plays with English experts more after the Jigsaw experience and one Spanish expert plays with English experts less. Two students get along better with homeroom friends after the Jigsaw experience and four get along less well than before. One student thinks that school work is easier to do after the Jigsaw experience while none of the students feel less positive about how easy it is for them to do their school work.

In summary, an analysis of the questionnaire shows that Classroom A has 18 positive changes and 16 negative changes in the ways that the students feel about school, friends and school work.

In Classroom B there are 20 students. Five students like school better after the Jigsaw experience and three students like it less. Three students feel happier in their homeroom after the Jigsaw experience and four feel less happy. Three students feel less bored in their homeroom after the Jigsaw experience and five feel more bored. One English expert plays more with friends at
school that speak Spanish after the Jigsaw and one plays less often. Three Spanish experts play more with friends at school that speak English after the Jigsaw experience and one plays with them less often. Eight students get along better with the kids in their homeroom after the Jigsaw experience and two students get along less well. Six students think that their school work is easier after the Jigsaw experience and one thinks that is not easier.

In summary, the analysis of the questionnaire for Classroom B indicates there are 29 positive changes and 16 negative changes.

Lesson Plans

In both classrooms there are Spanish and English experts. Each lesson plan includes second language support. The teachers present each lesson mainly in English. During each lesson, the teachers show materials in Spanish, clarify vocabulary, and ask follow-up questions in Spanish to ensure comprehension. Each Spanish expert chooses in what language they want to present the lesson.

In classroom A, all three Spanish experts present their lessons in English. 8 S goes to 5 S several times during the lesson to ask questions in Spanish, then returns to his group and presents the concept in English. 3 S and 5 S are fluent enough in English to present their lessons without assistance. During the lesson on body structure, the experts read the mini-book *Amanda The Ant* to their group. The three Spanish experts choose to hold their
books up in front of their groups and have the English experts read the little book aloud. This is one strategy the teachers use during shared reading in language arts. Each expert receives the study questions written in English on one side and in Spanish on the other side. 3 s and 5 s both read their study questions aloud in Spanish and translate the questions themselves and ask the questions in English to their groups. 8 S, who is less fluent in English, reads his study questions in Spanish and 1 E, who is fluent in both languages, translates the questions in English to the group.

In classroom B there are 8 English experts and 12 Spanish experts. Of the 12 Spanish experts, 6 are fairly fluent in English, 4 have basic English communication skills, and 2 have limited English skills. Of the 6 students who are fairly fluent in English, 5 give their lessons primarily in English with some translation or clarification from the group members. The sixth student, 35 S, relies on an English expert to read her lesson vocabulary in English, although the presentation materials are bilingual. 35 S is the only girl on her team and she tends to be hesitant to speak up and lead her group. She is academically capable and fluent enough in English to present her information, but lacks the confidence to take charge.

Of the four students who have basic English language skills, two depend on their team members to translate and present their lessons. The other two do not experience any
language problems because their team members are all fairly bilingual.

Of the two students who have limited English skills, one has a speech impediment and learning disabilities. It is difficult to understand the child in either English or Spanish. The teacher offers suggestions on how to present the information so that he does not have to read anything. However, when he presents to his group, he decides to attempt to read his material letter by letter. During both of his presentations, the teacher redirects and assists him. Nevertheless, he experiences difficulty remembering the content and ultimately relies on 34 S, a bilingual student, to read and translate the information for him. He is unable to read the study questions at all. Again, 34 S intercedes and reads the questions for him. He willingly accepts her help.

37 S is the second student who has limited English skills. This is her first year in the United States. She is a bright student and has a high level of academic potential. She demonstrates comprehension of English commands and commonly used classroom vocabulary, but cannot yet express herself orally. When she presents her lesson, she realizes that the two English experts in her group will not be able to understand her presentation. Before 37 S presents her lesson, one of the English experts, 25 E comes to the teacher and expresses concern about the limited English skills of 35 S. The teacher does not offer any solutions, but reminds 25 E that 37 S has the same language
concerns when someone presents to her in English. The teacher reminds 37 S to shelter her lesson by using her visual aids, her pointer, and her facial expressions to help the English experts understand her lesson. 37 S is able to do this, but relies on her bilingual teammate, 28 S to translate some of the lesson. The following day, 28 S is absent and 37 S comes to the teacher and expresses her concern that her group will not understand her lesson. Again the teacher reminds her of the techniques she can use to teach her lesson. She returns to her group and presents her lesson. Her English expert teammates understand the content of the lesson. However, because the lesson involves gluing sentences in a proper sequence, 37 S is unable to assist them. To complete the assignment, the English experts in her group get help from an English expert from another group.

Fill-in Assessments

Classroom A

The pre-assessment average of the scores of the Spanish experts is 10% and the post-assessment average is also 10%. The pre-assessment average of the scores of the English experts is 19% and the post-assessment average is 72%. The percentage gain for the Spanish experts is 0% and the percentage gain for the English experts is 53% (see Figure 1).
The three Spanish experts score very low. The teacher gives the three Spanish experts, the fill-in post-assessment again to verify their low scores. On both the pre and post-assessment 3 S scores 10%. The retake is given in a small group of four students and 3 S receives 90%. 8 S receives 10% on the pre-assessment and 0% on the post-assessment. He scores 60% on the retake. 5 S receives 10% on the pre-assessment and 20% on the post-assessment. He scores 30% on the retake. The teacher gives him the test orally and he scores 100%. 
There are five Jigsaw groups. The fill-in assessment is worth ten points. The average group scores on the pre-assessment range from 10% to 28%. The average group scores on the post-assessment ranged from 40% to 80% (see Figure 5).

![Figure 5. Fill-In Assessment Jigsaw Groups](image)

**Yes or No Assessment**

Classroom A

There are five Jigsaw groups. The Yes or No assessment is worth 10 points. The average group scores on the pre-assessment range from 30% to 55%. The scores of the post-assessment range from 62% to 73%. The percentage gains of the Jigsaw groups range from 7% to 43% (see Figure 6).
The pre-assessment average of the Spanish experts is 63% and their post-assessment average is 70%. The pre-assessment average of the scores of the English experts is 46% and their post-assessment is 65%. The percentage gain of the Spanish experts is 7% and the percentage gain of the English experts is 19% (see Figure 2).
Fill-in Assessment

Classroom B

The pre-assessment average of the scores of the Spanish experts is 8% and the post-assessment average is 45%. The pre-assessment average of the scores of the English experts is 16% and the post-assessment average is 69%. The percentage gain for the Spanish experts is 37% and the percentage gain for the English experts is 53% (see figure 3).
26 S receives 10% on the pre-assessment and 0% on the post-assessment. 26 S takes the fill-in assessment again three days later in a small group along with four students from Classroom A. Two of those students are absent during the first test and two are taking the test again to verify their earlier low test scores. 26 S receives 20% on his second post-assessment. The retest score is not part of the post-assessment final results. The test is only given to verify 26 S' earlier low score.

There are five Jigsaw groups. The fill-in assessment is worth ten points. The average group scores on the pre-assessment range from a low of 3% to a high of 23%. The scores on the post-assessment range from a low of 38% to a high of 68% (see Figure 7).
Yes or No Assessment

Classroom B

The pre-assessment average of the scores of the Spanish experts is 39% and their post-assessment average is 53% which is a percentage gain of 14%. The pre-assessment average of the scores of the English expert is 43% and their post-assessment is 66% which is a percentage gain of 23% (see Figure 4).

Figure 4. Yes or No Assessment
There are five Jigsaw groups. The Yes or No assessment is worth 10 points. The average group scores of the pre-assessment range from a low of 28% to a high of 50%. The scores of the post-assessment range from 38% to 70% (see Figure 8).
Purpose Of Research

This study examined the ways that Jigsaw learning affected children in a racially diverse classroom. The focus of the study was on the social dynamics and academic achievement of English and Spanish language first graders.

Social Dynamics

The analysis of the pre and post-sociograms in Classroom A indicated that most students chose the same friends to spend the night with whom they generally eat lunch. Only 4 out of 19 students chose a Jigsaw teammate to spend the night on the sociogram. The majority of the children chose different friends on the pre-sociogram than they did on the post-sociogram. Besides the unchanging friendship alliances of the most popular students, friendships seemed to be in a constant state of change.

The dynamics of friendships in classroom B were similar to the friendships in classroom A in that the majority of the students chose at least one friend to spend the night with whom they generally eat lunch each day. In addition, the sociograms and the free choice observations, suggested that friendships seemed to be in a constant state of change. The post-sociogram revealed different friendship alliances in classroom B than in classroom A. Unlike the popular students in classroom A, the friendships of the most popular students of classroom B did change over the course of the study. In classroom A, there were only 2
new friendships that resulted from Jigsaw groups, while in classroom B, 8 out of 20 students chose a Jigsaw teammate to spend the night on the sociogram. This suggested that the students in classroom B had a closer bond with their Jigsaw teammates than the Jigsaw teammates in Classroom A.

While there was some bonding between the first-grade Jigsaw teammates, they did not compare to the Jigsaw bonding of Aronson and Patnoe's (1997) third and fifth graders. Their upper elementary-aged students seemed to bond more than the younger-aged students in this study. Damon's (1977) research suggested that the rapidly changing friendship alliances of young children could be attributed to the child's level of cognitive development. Young children tend to base their friendships on temporal considerations. For example, a friendship may be determined by how nice someone is or what they can get from a friend at that moment rather than their actual shared history with a friend. In contrast, older children choose friendships based on shared interests and the ability to confide and depend on a friend over the course of a friendship. Another possible cause of the lack of bonding between the teammates in this study may have been time. Because of time constraints, Jigsaw teammates spent only twenty percent of their school day with their teammates. Had it been possible for them to spend more time together, more students might have bonded with and chosen Jigsaw teammates on the sociogram.
Academic Achievement

In studies by Aronson and Patnoe (1997), Slavin (1997) and Garibaldi (1997) minority students who spoke Spanish, out performed their peers who did not participate in Jigsaw learning. In this study, the Spanish speaking students were not compared to a control group. Their academic scores were compared to the academic scores of their English speaking peers.

In Classroom A, on both the fill-in and the yes or no assessments, the English experts out performed the Spanish experts (see Figures 5 & 6). The Spanish experts averaged 10% on the fill-in pre-assessment and 10% on the post-assessment. The English experts averaged 19% on the pre-assessment and 72% on the post-assessment. On the yes and no assessment, the Spanish experts averaged 63% on the pre-assessment and 70% on the post-assessment. The English experts averaged 46% on the pre-assessment and 65% on the post-assessment. While the scores on the yes or no assessment of the two groups are comparable, there was a real discrepancy on the fill-in assessment.

In Classroom B, on both the fill-in and the yes or no assessments, the English experts out performed the Spanish experts (see Figure 7 & 8). The Spanish experts averaged 8% on the fill-in pre-assessment and 45% on the post-assessment. The English experts averaged 16% on the pre-assessment and 69% on the post-assessment. On the yes and no assessment, the Spanish experts averaged 39% on the pre-assessment and 53% on the post-assessment. The English
experts averaged 43% on the pre-assessment and 66% on the post-assessment.

The current study hypothesized that the English and Spanish experts' scores would be comparable, but they were not. With one exception, the English experts generally knew more than the Spanish experts about the topic of ants before the study had begun. Materials were available in both languages and second language support was given. A possible explanation for the results in Classroom A might be that there were only 3 Spanish experts compared to 16 English experts. The Spanish experts received the majority of their content and study sessions in English. This might account for the discrepancy in the scores.

In Classroom B, there were 12 Spanish experts and 8 English experts. Unlike Classroom A where the amount of Spanish being used may have contributed to the low scores of the Spanish experts, in Classroom B more Spanish was used because of the higher number of Spanish experts. A possible explanation for the lower scores, might be that 5 out of the 12 classroom B Spanish expert were below grade level and/or have a speech impediment.

**Discussion and Recommendations**

Today more than ever, parents and taxpayers are demanding equity and accountability in education. Educators are being asked to improve the delivery of the curriculum and to use assessment as a tool in order to document equity and accountability. This study explored
cooperative learning as a way of boosting academic achievement of both minority and majority students.

In order to measure academic achievement, this study used two types of assessment: yes or no and a fill-in assessment. The students were more successful on the yes or no assessment than on the fill-in assessment. On the yes or no assessment, a student has a 50% chance of answering correctly and the teacher can not be entirely sure if the student knows the answer, or if the student is adept at guessing. With the fill in-assessment, it is easier to ascertain that the student knows the answer. However, some young children may lack the vocabulary to fill in the answer or have difficulty taking written tests. First grade is the first experience children have in taking written examinations and for many students, test taking is an overwhelming experience. To help students be more successful, a word bank should be included on the fill-in assessment to assist the student in writing and spelling the correct answer. Some of the most able students in this study scored poorly on the written tests. One student in particular, S, scored 20% on the post written fill-in test but scored 100% when he was given the test orally. This implies that instructors should use a variety of assessments, both written and oral in order to determine what students have learned.

There were two unforeseen problems with the questionnaire. First, the independent interviewer observed that most of the first graders had an extremely difficult
time answering the questionnaire using a Likert-type scale. When working with first graders, a questionnaire that allows open-ended answers might reveal more accurate answers about how they feel about school, school-work, and their peers. The second difficulty with the questionnaire was that some students, based their answers on how they felt at that moment, rather than reflecting on their whole school experience. Here again, an open-ended questionnaire would allow the interviewer to follow-up a response with a "tell me more" or "why do you feel that way?"

Every classroom usually has at least one child with behavior problems. Since the success of Jigsaw depends on student interaction and cooperation, a student with behavior problems can negatively affect the learning process of the other group members. In classroom B, one of the students, asked if it was possible to have one of his teammates removed from the team. The problem teammate had severe behavior problems and interfered with the group's ability to learn and study the content. Because this situation is likely to occur in any classroom, the teacher must intercede and work with the group to identify the problems and resolve the conflicts. Then the teacher can guide the group to generate some possible solutions to resolve the problem.

In both classrooms the teachers had students who did not seem to connect socially with their peers. In fact, the pre-sociograms revealed that four of the thirty-nine students did not get chosen even once by anyone. The
teachers had hoped that this Jigsaw experience might give these four students the opportunity to build friendships. Three of those students were chosen by a classmate on the post-sociogram, however the fourth student was again not chosen by anyone. All four of these students have academic weaknesses. Research in this area supports a connection between academic performance and self-esteem. This implies that students such as these four need more opportunities to build social skills which would contribute to higher academic achievement and a stronger sense of self-esteem.

Aronson and Patnoe's (1997) research recommended the use of Jigsaw learning with students in upper elementary grades. Upper elementary students are capable of reading, working, and studying independently. This study extended that research by adapting the Jigsaw concept to first graders. The Jigsaw groups were given independent group study time. The teachers discovered that first graders had a difficult time reviewing the information independently. They seemed to lack the academic maturity to study on their own. In addition, they were given too much material to review before the final assessment. A better pedagogy would be to break up the content and have several assessments rather than one final assessment.

It is possible that the scores on the assessments may have been higher if the study had been conducted during language arts when only one language was being used. However, there were several positive outcomes from
combining English and Spanish experts in this study. First, the students gained valuable communication skills from having to teach and learn using two languages. They were able to apply their second language skills in a meaningful context. Some of the students showed remarkable skill in presenting and sheltering their lessons to their teammates. When an English expert expressed concern that her team would not understand their Spanish expert's lesson, the teacher reminded her that the Spanish expert had the same dilemma when the lesson was taught in English. This sort of interaction helps create empathy and understanding between students who do not speak the same language. This is a valuable lesson in a racially diverse classroom.

The Jigsaw methodology was chosen for this study because it motivates students and builds self-esteem. Both of these factors were seen during the study. On days when the Jigsaw groups did not meet, the students voiced their disappointment. They looked forward to their Jigsaw sessions and repeatedly told the teachers how much they loved being the "expert". One of the students' favorite aspect of Jigsaw, was that they wore a special name tag that designated their areas of expertise. The students seemed to enjoy the status and responsibility of being "an expert". When asked how they felt about being the expert, one student replied "I feel good-nervous" and another one said "I feel excited". Each Jigsaw member presented two lessons and led one study session. Several of the students
were disappointed that they did not get to present more
times. This shows how strongly the students felt about
making decisions for their group and being involved in
their learning and the learning of their peers.

**Conclusion**

Despite the less than optimal results in academic
achievement and social interaction in this study, the
teachers are more convinced than ever of the potential
value of using Jigsaw with first graders. All of the
weaknesses that surfaced in this study, such as the
instruments used, time, behavior, language differences, and
the blending of diverse academic levels can be remedied.
The teachers plan to introduce Jigsaw to the students at
the beginning of the school year before friendships have
solidified. Rather than using content that requires
reading and writing, Jigsaw experts will be used to teach
classroom procedures, games, and art projects. This will
serve as a scaffolding on which the students can develop
the skills they will need for future Jigsaw activities that
require reading and writing in order to learn the content.
The teachers in this study consider this brief foray into
the Jigsaw experience merely a stepping stone onto their
path of understanding the significance and effects of
social interaction and academic achievement in a racially
diverse the classroom.
Stage 1
Three word sentences with repetitive vocabulary that matches the illustration.

English sample: See the dog. See the cat. See the bird.
Spanish sample: Mira el perro. Mira el gato. Mira el pájaro.

Stage 2
Five or six word sentences with repetitive vocabulary that matches the illustration.

English sample: They are running around the tree
They are running around the table.
Spanish sample: Ellos corren en el parque.
Ellos corren en la calle.

Stage 3
A short story of approximately 30 words with non-repetitive sentences that relate to the illustrations.

English sample: We walk to the store. We choose some apples and some bananas. With some help from mom we push the cart.
Spanish sample: Hoy es mi cumpleaños. Mamá me hizo un pastel. Mis amigos vinieron a celebrar conmigo.

Stage 4
A story of approximately 130 words with non-repetitive sentences that relate to the illustrations.

English sample: Sometimes the princess comes. She brings a treasure chest. We eat fancy cookies.
Spanish sample: Mi amigo se encontró una caja de juguetes. Me enseño la caja. Sacamos los juguetes y nos encontramos un robot.
Student Observation Sheet

Date ________________________
Observer ____________________
Situation ____________________
Instructions: Pretend that you are having a sleep over at your house. Your parents have told you that you can invite three friends from your homeroom. Who would you choose? Draw the three friends and write their names.
Instrucciones: Tus padres te han dicho que puedes invitar a tres de tus amigos de tu clase principal. ¿Quiénes vas a invitar? Dibuja a los tres amigos y escribe sus nombres.

Nombre_______________________ Fecha____________________

Nombre ______________________ Fecha _____________________
English Attitude Questionnaire

Name_____________________

Date_____________________

Interviewer_____________________

1. Do you like school this year?
   Never    Sometimes    Always

2. Do you feel happy in your homeroom?
   Never    Sometimes    Always

3. Do you ever feel bored in your homeroom?
   Never    Sometimes    Always

4. Do you play with friends at school that speak Spanish?
   Never    Sometimes    Always

5. Do you get along with the kids in your homeroom?
   Never    Sometimes    Always

6. Is it easy for you to do your school work?
   Never    Sometimes    Always
Spanish Attitude Questionnaire

Nombre____________________
Fecha____________________
Entrevistador(a)____________________

1. ¿Te gusta la escuela este año?
   Nunca       A veces       Siempre

2. ¿Te sientes contento(a) en tu salón principal?
   Nunca       A veces       Siempre

3. ¿Te sientes aburrido(a) en tu salón principal?
   Nunca       A veces       Siempre

4. ¿Juegas con amigos que hablan Inglés en la escuela?
   Nunca       A veces       Siempre

5. ¿Te llevas bien con los niños de tu salón principal?
   Nunca       A veces       Siempre

6. ¿Se te hace fácil hacer tu trabajo en la escuela?
   Nunca       A veces       Siempre
Expert Group Lesson One: Body Structure of Ants

Time: 20 minutes

Objectives:
1. Ants are insects.
2. Ants have three body parts: head; thorax; and the abdomen.
3. Ants have six legs and two antennae.

Materials Needed:
2. A picture of a human body with the body parts labeled for each expert.
3. One ant pointer for each expert

Literature:

Preparation:
1. Make a copy the mini book, Amanda the Ant for each student.

Second Language Support:
Read pages 2-7 in the book Las Hormigas to provide clarification of the lesson.

Anticipatory Set:
Show a drawing of a person and label the different body parts: head, trunk, arms and legs. Our bodies have specialized parts. Hands for grasping, eyes to see, legs for walking, etc. Ants also have specialized body parts.

Steps:
1. Relate our body parts to the ant’s body parts.
2. Ants have mandibles, we have teeth.
3. Ants can sting to catch their prey or to protect themselves. We have arms and feet to protect ourselves.
4. We need two legs. Why do you suppose that an ant needs six legs?
5. Ants have two antennae to smell, touch, taste, and hear. What do we have to help us smell, touch, taste, and hear?
6. Help the experts color their Amanda the Ant books and
6. Help the experts color their Amanda the Ant books and practice reading it together.

Closure:
Review the objectives and emphasize to the children the ways that our bodies and the ant's body are similar or different.

Expert review time:
Allow about 5 minutes for the experts to practice reading and identifying the ant's body parts to each other using their mini books before they go teach the lesson to their Jigsaw group.

Expert Group Lesson Two Body Structure of Ants
Time: 20 minutes

Objectives: 1. Ants have jointed legs.
2. Ants have an exoskeleton.

Materials Needed:
1. Literature selections listed below.
2. Copy of An Ant: Outside and Inside. Page 75 from Thematic Unit: Ants by Teacher Created Materials, Inc. for each expert.
3. Copy of Build an Ant on red, brown or black construction paper for each student from Ants*Alligator*Astronauts by Debby DePauw. Evan-Moor EMC282.
4. Copy of the human skeleton for each expert.
5. Glue and scissors
6. One ant pointer for each expert

Literature:

Preparation:
1. Run off An Ant: Outside and Inside for each expert.
2. Run off Build an Ant for every student.
3. Have a finished model of the Build an Ant project.

Second Language Support:
Review key vocabulary then check for comprehension by asking questions in Spanish. Do not ask questions
that can be answered by yes or no.

Anticipatory Set:
Discuss how our bodies move. Ask what children know about their internal skeletons and our joints.

Steps:
1. Read Chapter Two.
2. Discuss our internal skeleton and compare to the external skeleton of an ant.
3. Discuss our jointed arms and legs and compare to the jointed legs of an ant.
4. Show An Ant: Outside and Inside to the students and have them compare and contrast an ant's body with our own.
5. Model how to construct the Build an Ant model.
6. Have experts construct their own models of the ant.

Closure:
Review the objectives and emphasize to the children that without jointed legs and a skeleton the ants could not crawl and protect themselves.

Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.
Amanda the Ant

Amanda Ant is an insect.
She has six legs.

Amanda has two antennae.
Her body has three sections.

She has a head, a thorax, and an abdomen.
An Ant: Outside and Inside (cont.)

External
- head
- thorax
- abdomen
- antenna
- eye
- mandibles
- legs
- stinger
- gaster
- waist

Internal
- brain
- heart
- food passage
- crop
- stomach
- rectum
- mouth
- food pouch
- spiracles
- nerve cord
- poison gland
Study Questions
Body structure of ants

1. How do you know an ant is an insect.

2. Name the three body parts of an ant.
   __________________________
   __________________________
   __________________________

3. How many legs do ants have? __________________________

4. How many antennae do ants have? ______________

5. Ants use their antennae to:
   __________________________ and __________________________
   __________________________ and __________________________

6. What kind of legs do ants have? ______________

7. What do ants have on their body to defend themselves with? __________________________

8. What do ants use to grab their food?
   __________________________

9. How is an ant’s skeleton different from a human skeleton?
   __________________________
Nombre______________________________

Datos de Hormigas Para Estudiar
El cuerpo de una hormiga

1. ¿Cómo sabes que una hormiga es un insecto? __________

2. Las tres partes del cuerpo de una hormiga son:
   ______________________
   ______________________
   ______________________

3. ¿Cuántas patas tienen las hormigas? __________

4. ¿Cuántas antenas tienen las hormigas? __________

5. Las hormigas usan sus antenas para:
   ______________________ y ______________________
   ______________________ y ______________________

6. ¿Qué tipo de patas tienen las hormigas?
   ______________________

7. ¿Qué usan las hormigas para defenderse?
   ______________________

8. ¿Qué usan las hormigas para agarrar su comida?
   ______________________

9. ¿Cómo es diferente el esqueleto de una hormiga al de una persona? ______________________
Expert Group Lesson One: Ant Habitats
Time: 20 minutes

Objectives:
1. Most ants excavate their nests underground.
2. Anthills have many rooms connected by tunnels.
3. Each room in the anthill serves a particular function. Student will state at least three functions.

Materials Needed
1. Literature selections listed below
2. Activity page 9 - Ant mound
3. Copy of a simple house map
4. Black or red thin markers - one for each expert
5. Crayons
6. One ant pointer for each expert
7. Title labels for the rooms in the anthill
8. Glue bottles or glue sticks

Literature:

Preparation:
1. Mark pages to be used in literature selections.
2. Copies of activity page 9 - enough for all students in the class.
3. Sketch or make a copy a simple house map from a Social Studies textbook.
4. Make copies of the title labels for the rooms in the anthill.

Second Language Support:
Use literature selection Cuidad de Hormigas to point out labels in Spanish of the different rooms. Check for comprehension by asking questions in Spanish. Do not ask questions that can be answered by yes or no.

Anticipatory Set:
Anticipatory Set:
Introduce lesson by asking the students to describe what the inside of their house looks like. Ask how many rooms they have and what each room is used for.

Steps:
1. Discuss what human homes look like and show simple map of house.
2. Use literature selections to show what anthills look like.
3. Pass out activity page 9 and have students color the anthill and use a thin black or red marker to draw other things found in an anthill such as worker ants, dead insects, eggs, larvae, pupas, and the queen’s chamber.
4. Have students glue the title labels of the various rooms in the anthill.
5. Make sure all children have a complete drawing by asking questions. For instance, point to the a room or tunnel and say, “What is in this room?” or “Show me the queen’s chamber.”

Closure:
Review objectives and emphasize that just like human homes, ants have different rooms in their anthills.

Instructions to the experts in presenting their habitat lesson to their Jigsaw group:
Instruct experts to use their ant hill drawing and pointer to point out the various rooms in an anthill. Have children point out the colors used in the drawing to make it look more realistic. Remind them to monitor and assist the students in their group while they color and glue the labels on their pictures.

Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.
Objectives: 1. Carpenter ants build their nests in dead or living trees.
   2. Weaver ants build their nests in plant stems or leaves.
   3. Army ants do not have a true nest.

Materials Needed
1. Literature selections listed below
2. Labeled picture sheet of the four different habitats
3. Plastic miniature ants
4. Tape dispenser for each group or glue bottles
6. One ant pointer for each expert
7. Pictures of different types of human homes

Literature:

Preparation:
1. Mark off pages in literature selections.
2. Prepare a single sheet with small labeled drawings of a leaf, a cut away section of a tree, army ants, and an underground ant colony for each student.
3. Prepare an enlarged picture of each habitat for each expert to use as a visual aide when teaching.
4. Collect pictures of different types of homes

Second Language Support:
Use literature selection Cuidad de Hormigas to point out the various habitats in Spanish. Check for comprehension by asking questions in Spanish. Do not ask questions that can be answered by yes or no.

Anticipatory Set:
Start off lesson by asking children if all people live in the same types of homes. Ask what are some of the different types of homes that people live in - houses, trailers, apartments, boats, hotel rooms, street, huts, teepees, etc. Show picture cards of different homes.

Steps:
Steps:
1. Introduce lesson by discussing the various types of homes that people live in.
2. Use the literature selections to point out that ants also make their nests in various places.
3. Give each student a set of the enlarged habitats to use as visual aides when they teach.
4. Give students a copy of the labeled habitat sheet. Have students tape or glue miniature ants on each one of the different habitats.
5. Ask the children questions about the different types of habitats, for instance: “Where do carpenter ants make their nests?”

Closure:
Review the objectives of the lesson and emphasize that these are only some of the different ant habitats and that ants, like people, live in different types of homes.

Instructions to the experts in presenting their habitat lesson to their Jigsaw group:
Instruct experts to use their enlarged pictures of the habitats to point out that ants build their nests in different places. Remind them to pass out the single copy of the smaller habitat pictures and monitor and assist students as they color their pictures. Give them small plastic ants to pass out to each member of their group.

Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.
Army Ants ~ Las Hormigas Legionarias
Ants ~ Las Hormigas
Carpenter Ants ~ Las Hormigas Carpinteras
Weaver Ants ~ Las Hormigas Tejedoras
Ants

Las Hormigas

Army Ants

Las Hormigas Legionarias

Weaver Ants

Las Hormigas Tejedoras

Carpenter Ants

Las Hormigas Carpinteras
<table>
<thead>
<tr>
<th>1. entrada</th>
<th>2. almacen</th>
<th>3. la reina</th>
<th>4. invernadero</th>
<th>5. larvas</th>
<th>6. ninfas</th>
<th>7. huevos</th>
<th>8. áfidos</th>
</tr>
</thead>
<tbody>
<tr>
<td>entrance</td>
<td>storage room</td>
<td>queen's chamber</td>
<td>winter room</td>
<td>larvas</td>
<td>pupas</td>
<td>eggs</td>
<td>aphid room</td>
</tr>
</tbody>
</table>
Study Questions
Habitat

1. Do all ants live underground?

2. Where do weaver ants build their nests?

3. How do weaver ants build their nests?

4. Where do army ants sleep at night?

5. What do you call the cities that ants live in?

6. Where do carpenter ants live?

7. How do ants stay warm in the winter?

8. How do ants cool off the anthill when it gets too warm?

9. An underground ant colony is made of rooms and _________.

Datos De Hormigas Para Estudiar
Las Habitaciones

1. La mayoría de las hormigas viven _________.

2. ¿Cómo se llaman las ciudades de las hormigas?

3. ¿Dónde construyen sus nidos las hormigas tejedoras?

4. ¿Cómo construyen sus nidos las hormigas tejedoras?

5. ¿Dónde duermen las hormigas legionarias?

6. ¿Dónde viven las hormigas carpinteras?

7. ¿Cómo se calientan las hormigas que viven debajo de la tierra durante el invierno?

8. ¿Qué hacen las hormigas para refrescar el hormiguero?

9. Adentro del hormiguero las hormigas cavan C___________ y t______________.
Expert Group Lesson One: Ant Behaviors

Time: 20 minutes

Objectives:
1. Ants are social insects.
2. Hundreds of ants live together in big cities called colonies.
3. Different ants in the colony have different jobs. Ant jobs include queen ant, workers, soldiers and gatherers.
4. The queen ant is the most important member of the ant colony because she lays the eggs.

Materials Needed:
1. Literature selections listed below
2. Cut outs or copy of queen ant - one for each student in the class
3. Stickers of small ants - ten per each student in the class or fine tip markers to draw them.
4. A large sheet of white construction paper with an outline of an anthill
5. Crayons
6. Cut and paste labels for the workers
7. One ant pointer for each expert

Literature:
p. 7-8 & 22-23.

Preparation:
1. Run off picture of queen ant for each student.
2. Cut up stickers in sets of 10 ants per student or provide each student with a felt marker.
3. Draw or run off outline of large anthill for each student.
4. Copy job labels for each student.

Second Language Support:
Second Language Support:
Use literature selection *Cuidad de Hormigas* to point out labels and other information in Spanish of the different rooms. Check for comprehension by asking questions in Spanish. Do not ask questions that can be answered by yes or no.

Anticipatory Set:
Introduce lesson by talking about the different jobs that exist in the classroom. Ask why they think it’s necessary for each student to have a different job. Ask then what would happen if the teacher was in charge of doing all the jobs. If the teacher does not have classroom jobs, use examples of the workers in the school. Example: teacher, nurse, secretary, principal, custodian, and cafeteria workers.

Steps:
1. Relate the need for job assignments in an ant colony as well as in the classroom. Point out that ants already know what their job is when they are born.
2. Use illustrations in the literature selections to point out the different types of ants and their jobs.
3. Give each student a copy of a queen ant and explain to the children that the queen ant is the most important ant in the colony because she is in charge of laying the eggs.
4. Give each child a set of small ant stickers and have children compare the size of those ants to the queen ant. If not using ant stickers, emphasize that all ants are smaller than the queen.
5. Give each child a large outline of an anthill and explain to the children that they will be coloring the picture, gluing the queen ant, drawing or sticking the smaller ants, and gluing the worker labels.
6. Once the pictures are finished, ask the children questions about the various jobs and their titles.

Closure:
Review the objectives and emphasize to the children that without the different jobs, the ant colony would not be able to work together or survive for very long.

Instructions to the experts in presenting their behavior lesson to their Jigsaw group:
Instruct children to use their pointer and drawing to show the size of the queen ant compared to the rest of the ants. Tell them to talk about the different jobs in the colony and encourage them to point out the ants doing each job. Remind them to monitor and assist their group members as they make their own colonies.
Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.

Expert Group Lesson Two: Ant Behaviors
Time: 20 minutes

Objectives:
1. The stages of an ant’s life are called a life cycle.
2. The stages are called egg, larvae, pupae, and adult ant.
3. The new ants are either workers, new queens or males.

Materials Needed
1. Literature selections listed below
3. Crayons
4. Glue
5. Scissors
6. Flip or accordion books
7. Thin black marker
8. Pictures of animal life cycles
9. One ant pointer for each expert

Literature:

Preparation:
1. Mark off pages in literature selections.
2. Run off copies of activity page 5 - Life cycle for each student in the class.
3. Prepare flip books or accordion books to glue cycle pictures on for each student in the class.
4. Collect pictures of animal life cycles for each expert.

Second Language Support:
Second Language Support:
Use literature selection Cuidad de Hormigas to point out illustrations of the four stages in Spanish. Check for comprehension by asking questions in Spanish. Do not ask questions that can be answered by yes or no.

Anticipatory Set:
Start lesson off by discussing the different stages we go through as we are growing up. First we are in our mommy’s tummy, then we are born, then we start walking, etc. Relate our life cycle as people to the ant life cycle. Point out that they have different steps in their life cycle as well.

Steps:
1. Start off lesson by discussing the life cycle of humans and animals.
2. Use literature selections to show pictures of an ant’s life cycle.
3. Use proper vocabulary when talking about each stage: egg, larvae, pupae, adult ant.
4. Have students color and cut out the pictures from Activity page 5.
5. Have them glue the pictures on the flip or accordion book.
6. Review the stages by asking them to point to each stage and ask them questions about what happens in each stage.

Closure:
Review objectives and emphasize that ants, just like people and other animals, go through different stages before they become adults.

Instructions to the experts in presenting their life cycle lesson to their Jigsaw group:
Instruct the children to tell their Jigsaw group that they will learn about the ant’s life cycle. Tell students to show and explain the picture of the human’s life cycle to their group. They must show their flip book to the group to point out the different stages of the ant’s life cycle. Point out to the children how their group mates will make a flip or accordion book. Remind them to monitor and assist their group so that they follow the right steps in making the book.

Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.
The life cycle of an ant

by

eggs

The queen lays thousands of eggs.

larvae

The eggs hatch into larva. They look like fat, white worms.

pupae

The larvae become pupae.

ant

The pupae change into adult ants.
El ciclo de la vida de una hormiga

Por

huevo

La reina pone miles de huevos.

larvas

De los huevos salen las larvas. Las larvas parecen gusanos gordos y blancos.

ninfa

Las larvas se convierten en ninfas.

hormiga

Las ninfas se convierten en hormigas adultas.
Nombre: ____________________________

Datos De Hormigas Para Estudiar
Comportamiento

1. ¿Qué hacen los soldados?
2. ¿Cómo protegen los túneles los soldados?
3. ¿Qué hace la reina?
4. ¿Cuándo tiene las alas la reina?
5. ¿Qué hacen las cosechadoras?
6. ¿Cómo se envían mensajes las hormigas?
7. ¿Qué hacen las obreras?
8. ¿Qué hacen las hormigas para saber cómo regresar a su hormiguero?
9. ¿Después de que la reina pone los huevos, qué hacen las obreras con los huevos?
10. Nombra las cuatro etapas en el ciclo de la vida de una hormiga:

_________________________
_________________________
_________________________
_________________________

Nombre: ____________________________
Name: ____________________________

Study Questions
Behavior

1. What do soldier ants do?
2. How do soldier ants guard the tunnels?
3. What does the queen ant do?
4. When does the queen ant have wings?
5. What do the gatherer ants do?
6. How do ants talk to each other?
7. What do worker ants do?
8. How do ants know how to get back to the colony?
9. What happens to the eggs after the queen lays them?
10. Name the four stages of an ant’s life:
Objective: 1. Most ants eat ripe fruit, seeds and other insects.
2. Ants milk aphids for their honeydew.

Materials Needed:
1. What Ants Eat mini book for each student
2. Crayons and colored pencils
3. One ant pointer for each expert

Literature:

Preparation:
1. Run off What Ants Eat mini books for each student.

Second Language Support:
Use literature selection Cuidad de Hormigas to point out labels in Spanish of the different foods that ants eat. Page 25. Check for comprehension by asking questions in Spanish. Do not ask questions that can be answered by yes or no.

Anticipatory Set:
Give each student a cookie. A cookie is one type of food that we eat. Ants need food just like we do. Ask students to tell what types of food they eat. Ask why we need to eat food. How do we get our food to our houses? Ask what kind food ants eat?

Steps:
1. Show the book Ant.
2. Page 21: Mature ants are gatherers. They go out to collect food such as insects and seeds.
3. Page 22: Ants use their pincers to cut through the hard bodies of other insects so that they can eat the soft liquid insides. They also eat sweet food such as ripe food.
5. Page 24: We carry our food home from the story in a grocery bag. Ants collect their food and bring it back to the nest so that they can share it with the colony.
6. Show the book If You Were an Ant.
8. Pages 17-18: Ants leave a scent trail in order to return to the nest when they have found food.

Closure:
Restate the objectives of the lesson and have the experts practice reading the book to each other.

Instructions to the experts in presenting their What Ants Eat lesson to their Jigsaw group:
Experts will give each Jigsaw member a cookie as an example of what we eat and tell them that they are will learn what kinds of food ants eat. Remind them that they must read their books to their groups and encourage their teammates to color the pictures realistically.

Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.

Expert Group Lesson Two: Different Ants Eat Different Food
Time: 20 minutes

Objectives: 1. Different ants eat different food.
            2. Leafcutter ants grow mushrooms in underground gardens.
            3. Honey ants store honey in their abdomens for the colony to eat.

Materials Needed
1. Cut and match information picture sheets of leafcutter ants and honey ants
2. Glue
3. Crayons and colored pencils
4. Scissors
5. One ant pointer for each expert
Literature:

Preparation:
1. Make a copy of both cut and match information picture sheets for each student.

Second Language Support:
Read Spanish literature selections to check for comprehension. Ask follow up questions. Do not ask questions that can be answered by yes or no.

Anticipatory Set:
Each creature has its own particular kind of food that it prefers. For instance, wolves eat meat, cows eat grass and baleen whales strain plankton. Today we are going to learn about two different kinds of ants that eat different types of food.

Steps:
1. Show the book Ants.
2. Read pages 20-23.
4. Read page 7
5. Show the book Cómo viven las hormigas.
6. Read page 16.
7. Help students complete both of the cut and match information picture sheets.
8. Have students practice reading the information sheets.

Closure:
Review the objectives of the lesson.

Instructions to the experts in presenting their lesson to their Jigsaw group:
Show and read your cut and match information sheets to your Jigsaw group. Assist your Jigsaw group while they complete their information sheets.

Expert review time:
Allow about 5 minutes for the experts to practice teaching their lesson to each other before they go teach the lesson to their Jigsaw group.
### What Leafcutter Ants Eat

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1. Then, they carry the pieces of leaves back to the nest.

2. Finally, mushrooms grow on the mush and the ants eat the mushrooms.

3. First, Leafcutter ants cut up leaves with their strong jaws.

4. Next, other ants chew up the leaves into a mush.
Lo que comen las hormigas cortahojas

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Finalmente, cultivan hongos en los jardines subterráneos para alimentarse. | Luego, usan las hojas para construir jardines subterráneos. |

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Primero, las hormigas cortahojas usan sus mandíbulas para cortar hojas. | Después, ellas cargan los pedacitos de hojas y regresan al hormiguero. |
What Honey Ants Eat

1. Initially, the hanging ants swallow the honeydew and store it in their abdomens.

2. Finally, when other ants are hungry, the hanging ants give them some honeydew.

3. Then, other ants bring them a sweet liquid called honeydew from flowers.

4. The honey ants hang from the side of the anthill.
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<td>Finalmente, las hormigas que están colgando les dan miel a las otras hormigas cuando tienen hambre.</td>
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<td>Después, otras hormigas les traen un líquido dulce de las flores llamado miel.</td>
<td>Primero, las hormigas machiegas se cuelgan del techo del hormiguero.</td>
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Juego, las hormigas que están colgando, se tragan la miel y la macenan en sus abdómenes.
Study Questions
Prey

1. What do ants eat?
   ______________________ and ______________________
   ______________________ and ______________________

2. What do ants use their pincers for?
   ________________________________________________

3. Do ants like to eat the outside and inside of a dead insect? yes or no

4. Do ants like ripe fruit or fruit that is not ripe?
   ________________________________________________

5. Do ants like to eat salty or sweet food?
   ________________________________________________

6. What do leafcutter ants eat?
   ________________________________________________

7. What do leafcutter ants do with the leaves they collect?
   ________________________________________________

8. Where do honey ants get their food?
   ________________________________________________

9. Where do the honey ants that are hanging store the honey?
   ________________________________________________
Datos de Hormigas Para Estudiar
La presa de las hormigas

1. ¿Qué comen las hormigas?
   ___________________________ y ___________________________
   ___________________________ y ___________________________

2. ¿Para qué usan sus mandíbulas las hormigas?
   ___________________________

3. ¿A las hormigas les gusta comerase lo de afuera
   y lo de adentro de un insecto? sí o no

4. ¿A las hormigas les gusta comerase la fruta madura
   o verde? ___________________________

5. ¿A las hormigas les gusta comerase comida salada
   o dulce? ___________________________

6. ¿Qué comen las hormigas cortahojas?
   ___________________________

7. ¿Qué hacen las hormigas cortahojas con las hojas
   que colectan? ___________________________

8. ¿Dónde consiguen su comida las hormigas machiegas?
   ___________________________

9. ¿Dónde consiguen la miel las hormigas machiegas que cuelgan
   del techo?
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Spanish Yes or No Content Assessment

Nombre __________________________ Fecha ________________

1. Sí No Todas las hormigas viven debajo de la tierra.
2. Sí No Algunas hormigas se encargan de cuidar a los bebés.
3. Sí No Los cuerpos de las hormigas tienen dos partes.
4. Sí No Las hormigas legionarias construyen hormigueros grandes.
5. Sí No Las hormigas machiegas le roban la miel a las abejas machiega.
6. Sí No Las hormigas cortahojas cultivan jardines debajo de la tierra.
7. Sí No Las hormigas tienen huesos adentro de su cuerpo.
8. Sí No Las hormigas tejedoras construyen sus hormigueros arriba de la tierra.
9. Sí No Las hormigas le chupan la miel a los áfidos.
10. Sí No Cada hormiga realiza tres tareas.
1. Name the three body parts of an ant.

________________________

________________________

________________________

2. How many legs do ants have? ____________

3. Where do weaver ants build their nests?

________________________

4. Ants live together in cities called ________.

5. Name three different jobs that ants might have

________________________

________________________

________________________

6. Honey ants store honey in their _________. 
1. Nombra las tres partes que tiene el cuerpo de una hormiga.

________________________________________

________________________________________

________________________________________

2. ¿Cuántas patas tiene una hormiga? ____________

3. ¿Dónde construyen su nido las hormigas tejedoras? ________________________________

4. Las hormigas viven juntas en ciudades llamadas ____________________________.

5. Las hormigas realizan varias tareas. Nombra tres tareas.

________________________________________

________________________________________

________________________________________

6. Las hormigas machiegas guardan la miel en su ____________________________.
Lesson Plans: People Are Different

PEOPLE ARE DIFFERENT

OBJECTIVES
To demonstrate an awareness and appreciation of human differences.
To dispel fears and misconceptions about different types of people.

KEY IDEAS
Children may show a lack of respect for people who look different from those to whom they are accustomed. Children can be taught to dispel misperceptions about others by talking about differences in a matter-of-fact and respectful manner.

MATERIALS
Crayons, drawing paper, magazines, scissors

PROCEDURES
1. Ask children to draw or cut out pictures of people who they see as different from themselves. These people may be fat, thin, tall, short, wearing glasses, have different length hair, or different skin colors.
2. Mount the pictures on a bulletin board.
3. Seat the students in front of the bulletin board display. Point to a random picture and ask, “How is this person different from you?” “Is there any way in which you are alike?” Do this several times so that various students have an opportunity to respond to different pictures.
4. Ask the class, “Are each of you different in some way from the others in the class? How?”
5. Ask a series of questions beginning with, “Stand up if...”
   For example:
   Stand up if you have brown hair.
   Stand up if you wear glasses.
   The questions should reflect the diversity of the class. Questions can also go beyond physical characteristics (e.g., “Stand up if you’re the oldest in your family”). Encourage students to notice that they are members of many different groups. They are different from people in some ways and similar in other ways.
6. Put students in small groups and ask them to write a poem or a rap song about their differences and similarities.

Source Citation:
Adapted from Deborah A. Byrnes, “Teacher, they called me a ______!” New York Anti-Defamation League, 1987.
Lesson Plan: Making Judgements

Making Judgments

Objective:
To recognize how making judgments about someone without having adequate or firsthand information can have far-reaching consequences.

Key Ideas:
Children often make judgments about others based on limited experience or external appearance. Students are asked to see these tendencies as normal but also prejudicial and potentially destructive when applied to people.

Materials:
Two non-food treats (stickers, pencils, etc.), four identical boxes, fancy wrapping paper, ribbon, newspaper, string, one small slip of paper for each child.

Procedures:
1. Prior to the lesson, place a treat in two of the boxes. Wrap one of the treat-filled boxes with the fancy paper and the other with newspaper. Wrap one of the empty boxes with fancy paper and the other with newspaper. Place all the boxes in the front of the room. Number the boxes 1, 2, 3, 4 so that all students can see the numbers.

2. Pass out small slips of paper to students. Have each student write the number of the box he or she would like to open. Pass slips of paper to a designated student and have this student (or another) tally on the board how many votes each gift box received. If age appropriate, percentages could be determined as well.

3. Open the box which received the greatest number of votes. Then open the other boxes (in the order of most votes received) to reveal their contents. Discuss the following:

   Why did you choose the box you did?

   What helped you decide which box to choose?

   What did you learn?

   Do we ever judge people based only on what we see?

4. This next activity encourages students to consider the impact of discriminating against people based on insufficient information. Ask for volunteers to role play scenarios #1 and #2.

   What is the difference between the two scenarios?

   Which is an example of prejudice?

   Which is an example of dislike?

   Is it ever acceptable to dislike someone? When isn't it?
Lesson Plan: Words Can Hurt

**WORDS CAN HURT**

**OBJECTIVES**

To identify words that can be hurtful and to consider effective responses to hearing or overhearing hurtful words being used.

**KEY IDEAS**

Most children are the victims of hurtful words at one time or another. Name-calling or teasing can be damaging to their self-esteem. A hurtful word usually focuses on one aspect of an individual and makes that individual feel vulnerable. When repeated often enough, the words can wear away at a child’s self-esteem and make it difficult for him/her to respond effectively and seek support. Students will brainstorm responses both for the “victim” and for bystanders who are potential allies.

**MATERIALS**

Three puppets, note cards

**PROCEDURES**

1. Elicit a list of hurtful words from the class.
2. Use three puppetsto dramatize the following scenario:
   - Puppet #1: (to Puppet #2): Come on, let’s play tag!
   - Puppet #2: Can I play?
   - Puppet #3: Go away, stupid. (This word should be one of the hurtful words elicited from the class.) We don’t want to play with you!
   - Puppet #3: (Moves away with head down.)
3. Discuss with the class the following questions:
   - How would you feel if you were Puppet #3?
   - Why do you think Puppet #2 treated Puppet #3 that way?
4. Ask the class what they would do if they were Puppet #3.
   - Dramatize each response with the puppets. Ask the class to suggest things that Puppet #1 could do or say that would make Puppet #3 feel better. What could Puppet #1 say to Puppet #2?
   - Dramatize these options with the puppets.
5. The above activity can be done with older students if you use role-playing as a technique for acting out scenarios of name-calling that the students themselves identify. This can be done by asking students to think of a time when someone’s words hurt them and record it on notecards. The cards can be picked out of a hat and volunteers can role play the situation described.
Peer Interaction

References


CONSENT TO ACT AS A RESEARCH SUBJECT

Arlene Gnade and Patricia Rodriguez are conducting a study to find out more about the positive benefits of peer teaching using a cooperative learning strategy known as Jigsaw. All of the children in both classes of Gnade and Rodriguez will be participating in the Jigsaw activities.

If you allow your child to be in the study, the following will happen:

1. Your child will be assigned to a Jigsaw group and will participate in various team building activities.

2. The teacher will help your child become an expert in one area of a science unit about the behaviors, adaptations, habitat, and the prey of ants.

3. Your child will share their expert knowledge with their Jigsaw teammates.

Potential Risks

One potential risk is that extremely shy students might be hesitant to teach their topic to their Jigsaw group. The teachers will model and practice how to present with the expert groups to help shy or timid students. Another potential risk is that a student might be embarrassed if they can't recall information. If they can't recall information they will be encouraged to get help from another expert. A third risk is that Jigsaw teammates might laugh at or ridicule a teammate. To minimize or eliminate this potential, the teachers will model courtesy language and also supervise students when they are meeting with their Jigsaw groups. Participation in this study will involve about one hour per day for approximately four weeks.

Potential Benefits

The subjects will develop new friendships, experience tolerance and acceptance from their peers and learn content in a fun way. They will also learn responsibility and acquire experience in speaking and listening. They will become aware of how to communicate with someone who speaks a different first language than they do. The experience gained through the Jigsaw learning will help students build social skills that they will use throughout
school and in their professions. Organization, communication, and tolerance are usable skills that they will transfer to their personal and business lives. Focus will be directed on the academic achievement and social dynamics of the students. The first benefit will be that your child will master content through cooperative learning from their peers resulting in higher academic achievement. The second benefit will be that your child will voluntarily associate with his or her peers at lunch time and during free choice time in his or her ethnically diverse classroom after experiencing positive interaction with peers.

Gnade and/or Rodriguez have explained the study to you and have answered your questions. If you have others, or wish to report a research related problem, you may call Dr. Alice Quicho at the California State University, San Marcos At (760) 750-4035.

Participation in research is entirely voluntary. If at any time I choose to relinquish my permission and stop the interaction, I may do so without explanation and without penalty.

Confidentiality of the research records will be strictly maintained. The identity of my child will not be recorded by name in the written results of this project will not be used to compare my child to other children and that confidentiality will be maintained in every way.

I have received a copy of this consent document to keep.

I agree to have my child participate.

Parent’s Signature ______________________________ Date _____________

Researchers:
Arlene Gnade and Patricia Rodriguez
Jefferson Elementary School
801 Pine Street
Carlsbad, CA 92008
Phone: (760) 434-0693

Supervisor:
Dr. Alice Quicho
College of Education
California State University San Marcos
Phone: (760) 750-4035
CONSENTIMIENTO PARA ACTUAR COMO PARTICIPANTE EN UN ESTUDIO

Arlene Gnade y Patricia Rodriguez están conduciendo un estudio para aprender más acerca de los beneficios positivos de la enseñanza entre grupos cooperativos usando la técnica llamada “Jigsaw.” Todos los alumnos de Gnade y Rodriguez van a participar en las actividades de “Jigsaw”.

Si Usted permite a su hijo(a) a participar en el estudio, lo siguiente pasará:

1. Su hijo(a) va a ser asignado a un grupo de “Jigsaw” y participará en varias actividades que servirán para unir al grupo.

2. La maestra le ayudará a su hijo(a) a ser un experto en una área del estudio científico acerca del comportamiento, las adaptaciones, la habitación y la presa de las hormigas.

3. Su hijo(a) compartirá su información experta con su grupo “Jigsaw”.

Riesgos Potenciales

Un riesgo potencial es que un alumno tímido se sienta indeciso de compartir su información experta con su grupo “Jigsaw”. Las maestras les mostrarán a los alumnos como deben presentar su información y les darán tiempo para practicar antes de presentar su información al grupo “Jigsaw”. Otro riesgo potencial es que un alumno sienta vergüenza si no recuerda su información. En este caso, el alumno puede acudir a otro experto y aclarar su información. Otro riesgo potencial es que los miembros del grupo “Jigsaw” se burlen de uno de los miembros mientras presenta su información. Para evitar esta situación, las maestras les enseñarán a los alumnos a usar palabras de cortesía y a tratarse con respeto. Las maestras servirán como supervisoras de todos los grupos mientras los expertos presentan su información. Los alumnos participarán en el estudio diariamente por una hora por aproximadamente cuatro semanas.

Beneficios Potenciales

Los alumnos formarán amistades nuevas, tendrán experiencia con la tolerancia y aceptación de sus compañeros y aprenderán el contenido en una manera divertida.
Aprenderán acerca de la responsabilidad y adquirirán experiencia en las áreas de hablar y escuchar. También aprenderán como comunicarse con otros alumnos que quizás hablen otro idioma.

La experiencia que los alumnos van a lograr a través de su participación en “Jigsaw” les ayudará a añadir amistades nuevas a su grupo social y les ayudará a construir técnicas sociales que podrán usar por el resto de sus años escolares y en sus vidas profesionales. La organización, la comunicación y la tolerancia son destrezas transferibles que los alumnos usarán en sus vidas personales y profesionales.

El énfasis del estudio se enfocará en el éxito académico y las técnicas sociales de los alumnos. El primer beneficio será que su hijo(a) aprenderá el contenido a través de su participación en un grupo cooperativo resultando en un rendimiento académico más alto. El segundo beneficio será que su hijo(a) va a asociarse voluntariamente con sus compañeros durante el almuerzo y tiempo libre en el salón después de haber tenido una experiencia positiva con sus compañeros.

Gnade y Rodriguez me han explicado acerca del estudio y han contestado mis preguntas. Si tiene otras preguntas, o desea reportar un problema con el estudio, puede a llamarle a la (profesora) Dra. Alice Quijoch a la Universidad del Estado de California, San Marcos al (760) 721-6011.

La participación de mi hijo(a) es totalmente voluntaria. Yo tengo el derecho de renunciar mi permiso para que mi hijo(a) no participe en el estudio sin ninguna explicación o consecuencia.

Yo entiendo que los resultados del estudio serán confidenciales y no serán usados para comparar a mi hijo(a) con otros estudiantes. El nombre de mi hijo(a) no será mencionado ni escrito en los resultados del estudio y no se usarán cámaras de video para grabar a mi hijo(a).

He recibido una copia de la forma de consentimiento para guardar en mis archivos.

Doy permiso para que mi hijo(a) participe en el estudio.

Firma de Padre/Madre o Guardian  
Fecha
Investigadoras:
Arlene Gnade y Patricia Rodriguez
Escuela Jefferson
801 Pine Street
Carlsbad, CA 92008
Teléfono: (760) 434-0693

Supervisora:
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