Cooperative Learning/Teaching Model:

Promoting a safe, positive, and student-centered learning environment

Eastern Washington University
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Chapter 1: Introduction

In my six years of teaching, I have consistently searched for ways to promote student learning through group-oriented activities. I am a seventh grade science teacher and feel that I have been able to foster science labs in which students work together in groups to complete a lab using the scientific method. The science labs have worked well for me, however, I was still searching for teaching strategies that allow all students to benefit by gaining a deeper knowledge of the subject matter through communicating with their peers and building relationships among their peers of different ethnic backgrounds, learning abilities, and gender. Therefore, for this study, I have decided to research the Cooperative Learning Teaching Model (CLTM).

Cooperative learning is a teaching strategy in which students varying in ability work together on a range of activities related to the subject area (Kagan, 1994). The CLTM is an instructional method in which students work in small groups to accomplish a common learning goal under the guidance of a teacher. This method consists of students of different gender, ethnic backgrounds, and learning abilities, contributing equally to a science project or lab. The CLTM has been used in classrooms to promote an environment through which students can work in small groups that may influence their social and communication skills, increase the acceptance of diverse backgrounds, and improve academic achievement (Lin, 2006). The CLTM may also help increase on-task behavior, resulting in students being consistently focused on the group project (Pate-Clevenger, Dusing, Houck, Zuber, 2008).

This chapter will illustrate the significance of this study, the area of focus, research questions, possible limitations, definitions of terminology, and evidence that will be collected, as it relates to the Cooperative Learning/Teaching Model.

Significance of this Study
The significance of this study is to use the Cooperative Learning/Teaching Model in the science classroom to promote a safe, positive, and student-centered learning environment. A safe and positive environment involves students from different ethnic backgrounds, learning abilities, and gender, working together respectfully towards a learning target. The CLTM is important in this regard because the skills involved could transfer to real world (Loeser, 2008). Students learn positive communication and leadership skills, accountability, multicultural sensitivity, and reflection on their own learning style, which will be further addressed in the literature review of this paper (Lin, 2006; Loeser, 2008).

The Cooperative/Learning Teaching Model can be beneficial to both students and teachers in regards to a safe, positive, and student-centered learning environment. CLTM teaches students to positively collaborate and communicate by talking to each other one on one and expressing their ideas in a respectful manner. It is also beneficial to students as they become more involved with the subject matter when in small groups compared to large groups (Loeser, 2008).

The CLTM can be beneficial to teachers because it shifts some of the responsibility from the teacher to the students. Students are held accountable for their learning through group activities, labs, and projects. In the groups, students have different roles so that they are each responsible for a certain part of the assignment. If a group is floundering on a project, the teacher can act as a mentor and redirect them to solve the problem positively as a group. For example, the teacher could model proper communication skills for students to use to get back on track. The CLTM is also beneficial to the teacher because it offers maximum engagement of student participation, therefore students have less time to become off-task and disruptive (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008).
As with every teaching model, the Cooperative Learning/Teaching Model owns its concerns. The criticisms of the CLTM are focused mainly on gifted students and students with special needs (Loeser, 2008). Some skeptics express apprehension with this teaching model because they believe that students that are gifted will feel like they are the individuals doing all of the work and that the group depends on them to get a good grade. It is also believed that students with special needs will respond negatively to the teaching model because they may feel inadequate in the group, which would then decrease their confidence and self-esteem in these types of settings. For these types of students, the teacher needs to be sure to create a rubric or have students create a rubric that reflects the individual roles of each person in the group. One such rubric would allow students to be proficient in their group role and be evaluated individually as they contribute to the group as a whole, rather than all of the roles averaged into one grade for the group. This method of evaluation would permit gifted and special needs students to excel in their “area of expertise” within the group assignment and preserve the CLTM expectation that they learn to communicate and collaborate with their group (Lin, 2006; Loeser, 2008).

As our society becomes increasingly diverse, the Cooperative Learning/Teaching Model focuses partly on organizing students into groups of different ethnic backgrounds so that they can build better relationships with each other (Johnson and Johnson, 1999). At the national level, “one main objective of our education system is to prepare our students to interact in an ever more diverse society” (Loeser, 2008, p.2). Our students will be directly affected by a society, consisting of people of many different cultural backgrounds and will need to have the skills necessary to communicate with people varying in their ethnicities, views, and abilities. At an international level, students will be, or already are, entering into an age of a global economy
where business communications are being done between different countries. The cooperative learning model, if used properly, can foster an equitable environment in the classroom through which students learn to respect different views, cultural differences and similarities, and varying learning abilities. Research shows that “cooperative learning promotes better relationships among students with special needs and varying races and ethnicities” (Lin, 2006, p. 35).

In the Spokane Public School District, “our goal is to help all students succeed at each grade level and graduate from high school ready for whatever path they decide to follow next” (www.spokaneschools.org). In order to achieve this goal, school administrators continue to focus their efforts on group collaboration among teachers and encourage teachers to do the same in their own classrooms. Administrators focus on fair and equitable instruction for all students regardless of gender, race, or socioeconomic status. One middle school’s mission statement is “to promote and support an environment that fosters integrity, requires commitment, and nurtures individuals to be socially responsible and academically accountable” (www.spokaneschools.org/salk/vision.htm).

I believe that I have benefited both professionally and personally from investigating this topic. Professionally, I have gained a new outlook on how I want to run my classroom. The middle-school aged group is so diverse in terms of maturity, responsibility, and accountability, I think that the CTLM may help me offer my students ways to work together in an environment where they can learn from students of different ethnic backgrounds, learning abilities, and gender. I also think that the CTLM may help my students become more accountable for their own work and increase on-task behavior as they work on the cooperative learning projects.

Personally, I have gained more confidence in my teaching abilities, which in turn has increased my motivation and dedication to teaching middle school students. I have always said
from the beginning of my career that I chose to work towards teaching middle-school students first before I chose anything else. The pre-teen period fascinates me and I am consistently searching for new ways to teach that age group to become socially responsible adults. I think that the Cooperative Learning/Teaching Model directly addresses these issues.

**Area of Focus**

The purpose of this project is to promote a safe, positive, and student-centered learning environment through the Cooperative Learning/Teaching Model.

**Research Questions**

The questions for this action research project are as follows:

1. How might be the Cooperative Learning/Teaching Model used to improve student engagement?

2. What are student attitudes toward cooperative learning as defined by the Cooperative Learning/Teaching Model?

3. How might Cooperative Learning/Teaching Model influence students’ communication skills?

4. How should Cooperative Learning/Teaching Model be effectively implemented?

5. How might Cooperative Learning/Teaching Model influence student attitudes towards their peers?

**Possible Limitations**

Because the school district that I teach in prescribes the science curriculum, one limitation might be that teachers are required to teach a certain amount of information during the course of the year. This might make it difficult for the teacher to fully implement the CTLM. In order for the CTLM to work, a teacher needs to allow a student-centered environment to evolve,
instead of a teacher-centered environment (Felder & Brent, 1994). Another limitation might be
the different dynamics of students’ lives. Because student’s lives are very different from one
another, it may be difficult for a group to help a student who has been regularly absent catch up
without the group falling behind.

**Definition of Terminology**

**Cooperative Learning Teaching Model** – an instructional method in which students work in
small groups to accomplish a common learning goal under the guidance of a teacher.

**Think-Pair-Share** – a review tactic used where students first think about a concept and write
down ideas, then pair with a partner and share their ideas with each other.

**Formal Roles** – a grouping method used where each student in the group has a specific role (i.e.
leader, recorder, time keeper, and presenter).

**Jigsaw** – a grouping method where students are put together in groups of four called “home
groups” and each student is given a number (1-4). Students work with their home group first and
then switch to working with their “expert groups” (groups of the same number). After working
with their “expert groups”, students return to their “home groups” and share what they have
learned.

**Group Investigation** – a grouping method where students are allowed to pick the members in
their group and then choose a topic given from a teacher’s list that is related to the content area.

**K-W-D-L (Know-Want to know-Do-Learn)** – a teaching method used where students discuss
their prior knowledge on the topic, what they want to find out, what they do to solve their
problem, and what they learned from the process.

**On-Task Behavior** - In relation to this study, students working consistently on the class
assignment, either individually or with their group. On-task students focus on the learning
activity and refrain from walking around the room or visiting with students not in their group about matters outside of the learning activity.

Communication Skills – In relation to this study, students use of respectful voice tones, active listening, and problem-solving techniques.

Yellow Behavioral Slip – A small piece of yellow paper given to a student that is off-task during instruction. A yellow behavioral slip explains to the student that they have been warned and owe one minute after class. If a student continues his/her behavior, the yellow behavioral slip is signed by the teacher, which indicates a lunch detention, office referral, or a call home, depending on the situation.

Refocus Form – a blue piece of paper a student completes if they are off-task during instruction. Used toward the end of the second quarter and during the third quarter of this study, students were asked to complete a refocus form in a different teacher’s room while they assessed their behavior. Students returned to their own classroom once they felt ready to participate with the rest of the class.

Office Referral – a form filled out when a student’s behavior has exceeded the classroom discipline system and is therefore referred to an administrator.

Evidence to Collect

The data I collected for this project includes student surveys, student self and group evaluations, tabulation of yellow behavior slips, video and picture observations, teacher/administrator/academic coach observations and notes, and student daily work and test scores.

Students were surveyed before and after the cooperative learning jigsaw model was introduced. I anticipated that I would survey the students before and after each time I used the
jigsaw method through out the year. I had students evaluate themselves and their group after each time I used the cooperative learning method as well so that I could get a sense of whether students became more adapted to cooperative learning as it was implemented through out the year.

During the course of this project, I tabulated the number of yellow behavior slips that were given before and after the jigsaw model was introduced. I kept an ongoing Excel spreadsheet of the number of yellow behavior slips and refocus forms that were given when cooperative learning was implemented compared to the amount given after implementation.

Video and picture observations of students working in cooperative groups would be collected for data analysis. I would take pictures and videos of students in the classroom as they worked in cooperative groups through out the year. Due to time limits, I deleted this item from implementation. I also recorded my own notes and collected notes from administrator and academic coach observations as they related to cooperative learning in my classroom.

Finally, I collected data of student daily work and test scores before and after the cooperative learning model was introduced. I kept an ongoing spreadsheet of student test and daily work scores throughout the year.
Chapter 2: Literature Review

This literature review will focus on cooperative learning and more specifically, the Cooperative Learning/Teaching Model (CLTM). Based on cooperative learning, a teaching strategy in which students varying in ability work together on a range of activities, the CLTM focuses on combining students of different ability, ethnic background, and gender into small groups to work towards a common learning target. Authors of this literature have focused on the effects of the CLTM in the classroom from many different angles. Some researchers have studied the effects of cooperative learning on student achievement and accountability (Loeser, 2008; Slavin 1996), while others focus on student relationships with their peers and classroom behavior (Webb & Mastergeorge, 2003). The Cooperative Learning/Teaching Model is one that may influence student engagement, ownership and accountability, relationships between peers, and classroom environment.

This literature review will address different questions that relate to the Cooperative Learning/Teaching Model (CLTM) and its applications to the classroom. I will first define what the CLTM is and explain its history along with any misconceptions that are found. The questions I will address will go into detail about the effects of the CLTM on student learning, student relationships, the relationship between cooperative learning and classroom environment, and benefits of cooperative learning to the student on a personal level.

Definition and History of the Cooperative Learning Teaching Model

The Cooperative Learning/Teaching Model is a teaching strategy in which students are grouped together to work on a common task while demonstrating successful communication skills and positive social interactions (Lin, 2006; Loeser, 2008). As students work in groups, they communicate with one another to solve problems, help each other, and prepare each other
for an assessment, whether it is a project or test. Cooperative learning has been studied since the 1920's, however, significant contributions made by David Johnson, Roger Johnson, and Robert Slavin have been seen in the last thirty years (Loeser, 2008). Slavin (1999) reports that "almost unknown in the mid-1970s, cooperative learning strategies are now so common-place that they are often seen as a standard part of educational practice, not as an innovation" (p.1).

Specifically, the Cooperative Learning/Teaching Method is widely used in K-12 classrooms (Loeser, 2008). Some authors (Lin 2006, Loeser 2008) believe that the CLTM is a reasonable strategy to use in the classroom because it prepares students for many career paths that require people of different ethnicities and backgrounds to work together in teams on a common task. As our society becomes more diverse in a global economy, students will need to have the skills to communicate, relate, and work with people of different ethnicities and backgrounds.

**Misconceptions**

Some teachers believe that the CLTM is to group students without giving them a format to follow. For instance, teachers may want their students to work in groups but they do not explain to the students what is expected of them while they are in these groups. When using the CLTM, teachers can assign roles or responsibilities to each student of a group so that one student does not end up taking on the entire project and others are not contributing (Slavin, 1999).

**Effects of The Cooperative Learning Teaching Model on student learning**

As with any teaching method, there can be positive and negative effects with the Cooperative Learning/Teaching Model.

*Positive effects*

The Cooperative Learning/Teaching Model has had positive effects on student behavior, achievement, and peer relationships. The CLTM is designed so that students can work together
on a common topic or project where each student is responsible for a certain part of the project, but are also responsible for helping and communicating with their project members (Johnson & Johnson, 1999; Loeser, 2008; Slavin, 1996).

Noreen Webb and Ann Mastergeorge explain that students learn from the CLTM through “giving and receiving help, sharing knowledge, building on each other’s ideas, recognizing and resolving contradictions between their own and other students’ perspectives, observing others’ strategies, and internalizing problem-solving processes and strategies that emerge during group work” (2003, p.362). Certain authors also stress that the CLTM has become more popular in the teaching world because it has shown an increase in student achievement, motivation, self-esteem, on-task behavior, peer relationships and acceptance of others (Loeser, 2008; Webb & Mastergeorge, 2003). The CLTM allows students to continually communicate with each other in order to complete the activity or project that they are working on, so it is necessary for them to express their own ideas as well as listen to others’ ideas. In an article written by Emily Lin, she expresses that “cooperative learning promotes student involvement and engagement.” (2008 as cited in Chin & Brown 2000; Jones & Carter 1998; Kagan 1994; Wood 1992).

In a research study by Gokhale (1995), a total of 48 college students participated in the study that compared pre and post-tests that were given after the lecture teaching model and the CTLM were used. Each sample class had 24 students. Each sample group was given the same content and worksheet. The lecture-teaching group worked individually on the worksheet and then compared answers to an answer key. The collaborative learning group worked in groups and discussed their thoughts with each other as they answered the questions. These students were encouraged to listen to each other’s comments. The findings of this study indicated the mean of posttest scores for the collaborative learning group, which was 12.21, was higher than
that of the individual learning group, which scored 8.63. The research found that collaborative
learning promoted the development of critical thinking skills and the explanation and evaluation
of ideas.

**Negative effects**

Although there are many positive effects of the Cooperative Teaching/Learning Model, there are also some negative effects that have been recognized. Some critics of the CLTM are concerned with students who are either gifted or have special needs and feel that these students would not benefit from cooperative learning. It has been articulated that students who may be gifted or even used to being in control of their own work may feel “turned off” by the CLTM due to their perception that they are the ones doing all of the work in order to achieve the grade that they want. It is also explained that students with special needs may feel inadequate in fulfilling the project expectations and therefore may have decreased confidence in their capabilities of being a part of a group (Loeser, 2008).

Robert Slavin (1999) stresses that the dangers of teachers not using cooperative learning correctly can have negative effects on student learning and engagement. One student might do all of the work or take on the “thinking roles”, while other students take on more passive roles like recording notes or may even be ignored based on their learning ability.

**Relationships between students of different backgrounds, cultures, and learning abilities as they relate to cooperative learning**

Although it is important for teachers to use the CLTM appropriately to achieve maximum student engagement, it is also important for the teacher to introduce cooperative learning to the students in ways that promote positive relationships. The teacher can foster an introduction to the CLTM through preliminary activities and communication activities. After a teacher has
introduced the CLTM to her students, she will need to set up the model in a way that is conducive to the students.

*Preliminary activities*

Within the CLTM, it is important for teachers to first set up activities in which students can get to know each other in a fun, easy-going environment. These activities are also called “icebreakers”, where students can learn each other’s names and interests. An example of an icebreaker is an activity by which students first learn each other’s names then rearrange themselves and re-identify each other. To learn each other’s interests, the teacher could have students contribute their own interests onto a list, then reproduce the list and have each student try to find who matched the list through interviews and groups discussions (Webb, Nemer, Kersting, Ing, & Forrest, 2004).

*Communication activities*

Along with students engaging in activities that allow them to get to know each other, it is important for students to participate in activities that can help them improve their communication skills (Kagan, 1994; Loeser, 2008; Webb, et al., 2004).

First, the teacher will need to demonstrate to the students, ways to communicate to each other. For instance, in a study done by Webb, et al. (2004), it was described “the teacher introduced norms for group behavior, and the class discussed and made charts for posting in the classroom” (p.6). In order for students to understand how to communicate with each other, it is important for the teacher to first model appropriate skills to solve disagreements, help each other, encourage each other, and work with each other (Loeser, 2008; Webb et al., 2004).

Second, after the teacher has modeled this appropriate behavior, students can then practice ways to communicate to one another that are encouraging and non-offensive.
study done by Webb, et al. (2004), students were taught different ways to handle awkward or
difficult situations with other students. For example, when a student in a group is not doing the
work or looks like they are stuck and do not know what to do next, a student can simply say to
them, “If you need help, ask me”. If the student then asks for help, the other student can say,
“Sure I’ll help you. What don’t you understand?” (p.8). Students are also taught to be good
listeners and let their group member explain what they do not understand before they help their
group member solve the problem.

Using these methods effectively can promote acceptance between students of different
backgrounds, ethnicities, and learning abilities. Studies have shown that when students work in
a cooperative learning environment, they are more likely to have more acceptance and
understanding of students that are different from them rather than when they work by themselves
or in a lecture-style environment (Lin, 2006). Students who are involved in the CLTM have
better relationships between other students with special needs or of different ethnicities (Johnson
& Johnson, 1999).

*Cooperative learning set-up*

In order to set up the CLTM, it is important for a teacher to have sufficient space for the
students to work in. It is also important for a teacher to set specific classroom guidelines so that
the students know what is expected of them as they work (Loeser, 2008; Munro 2008; Simonsen,
Fairbanks, Briesch, Myers, & Sugai, 2008). In order for students to have a voice in classroom
expectations, a teacher can have students discuss what they think should be expected of them,
then come up with guidelines as a class and have students create posters to be posted in the class
After the classroom expectations have been set, teachers then will need to arrange their students into different groups. Teachers can arrange the students into heterogeneous groups, where each group has students that are of different ethnicities and learning abilities, or teachers can arrange students in homogeneous groups where students in the group are of similar learning ability (Lin, 2006).

There are different methods in the CLTM that teachers can use as the students work in their groups. One method that teachers can use is called the jigsaw method. In the jigsaw, each student of the group is in charge of a specific topic that ultimately will be part of the final group project. The teacher can have the groups collaborate and choose who is responsible for each topic of the project. Then, the teacher can have students in the class that are responsible for the same topic meet in “expert groups” to learn and share information about the topic. Later, the teacher can have the students meet back in their original groups to share the information they learned from the “expert groups” (Lin, 2006; Loeser, 2008).

Another method that can be used is the role-play method where students are assigned different roles for the activity. All students are expected to work together on the activity, however each student will have a different responsibility to ensure that the work is done correctly and in a timely manner. For instance, one student in the group may be the recorder that writes down the information that is shared. Another student may be the timekeeper to make sure that they are working in a timely fashion and yet another student may be the presenter who is responsible for relaying the information to the rest of the class at the end of the activity (Lin, 2006; Loeser, 2008; Slavin 1996).

Finally, it is important for the teacher to have self-evaluations readily available for the students so that they can self-assess how they contributed to the group as well as reflect on how
their group worked together. It is important for the teacher to have a system in place where students can self-assess their own work as well as their group members work. In an article on cooperative learning and assessment by David W. and Roger T. Johnson (1999), it is explained that a teacher can put the students in charge of self-assessment and group-assessment where they compare homework and share roles in explaining the work to each other and checking for accuracy. This idea creates a more student-centered environment where students can learn from each other.

**Relationship between the Cooperative Learning Teaching Method and classroom environment**

While the Cooperative Learning Teaching Method focuses on a student-centered environment with students working together in groups and reflecting on their own progress as well as their group’s progress, it can also affect the overall classroom environment. Student-to-student interactions, student-to-teacher interactions, student engagement and motivation, and student behavior are all contributors to the classroom environment.

**Positive student-to-student interactions**

With the CLTM, teachers can expect positive interactions between students. Since cooperative learning focuses on students communicating, helping, and working with one another, students have more opportunities to solve problems with the group or with the activity that is being done in a more mature way. Students are held accountable for their own learning; however, they work together to help each other learn the information. Teachers can set up their classroom for students to learn the information within their own group and later take a quiz or test individually. This way, students are held accountable for learning the desired information, but they learn it with their group and then demonstrate their own knowledge later (Loeser, 2008;
Slavin, 1996). Teachers can take advantage of differentiated learning and test students differently based on the student’s learning ability, but still assess their knowledge of the topic at hand.

The Cooperative Learning/Teaching Model also allows students to relate with their peers instead of the traditional teaching methods where the student primarily relates to the teacher. Webb and Mastergoerge state “collaborative peer learning environments have received increasing attention in classrooms due to the potential for improving learning and achievement, increasing students’ motivation and time on task, contributing to increased self-esteem, focus of control, liking and acceptance of others, as well as the ability to relate to others, and development of teamwork skills” (2003, p.362). Cooperative learning between students in a school environment is a way for teachers to introduce to students what will be expected of them when they enter the working society where often times people will work in teams within their own career. Student interactions with those of varying ethnicities, backgrounds, and learning abilities will also play an important role as our country becomes more diverse. Students will need to have the essential communication skills and understanding of these differences in order to work in a diverse climate (Loeser, 2008).

Positive student-teacher interactions

Although the CLTM promotes student-to-student interactions, it also can have positive student-to-teacher interactions. In the book Love and Logic, authors Jim Fay and David Funk (1995) explain that when students are offered choices in how they learn, they are more likely to have a vested interest and are, therefore, more engaged in what they are doing. The teacher can allow students to choose what part of the project or activity they would like to do related to the
topic that is being taught. Students can also have a choice of different roles within the group if a teacher is using role-play as a cooperative learning method.

In theory, it would be expected that a student would have a positive experience while the CLTM is being used because they have more interest in what they are doing, they are working with their peers, and are receiving help and feedback from other students as well as the teacher. Because a student would be having a positive experience, one would think that the student-to-teacher interaction would also be positive. In an article written by Susan Munro, she states, "A classroom may meet all structural regulatory requirements, but this says little about the child’s experience." "More important are dynamic factors in the classroom - the nature of the children’s experiences, including interactions between teachers and children" (2008, p. 46).

In a NEA Today article written by Ellen Flannery (2008), it is indicated that a strong tactic for teachers to use in the classroom is to address to the students openly about the concerns the teacher may have in regards to classroom management. Flannery explains that teachers can use surveys to ask students their opinions about the current classroom environment and what ideas they might have for improvement. This way, students have a voice in deciding classroom expectations and may feel more accountable for the learning environment.

**Student engagement and motivation**

Because student-to-teacher interactions are critical in the classroom environment, it is important that teachers recognize that two of the main factors of the CLTM are the fostering and promoting of student engagement and motivation. Middle school aged students especially will demonstrate more engagement and motivation when the focus is on a "team" working together towards a common academic goal. Because that age group can be primarily concerned with
group-oriented activities rather than individual activities, cooperative learning can be a successful teaching strategy (Slavin, 1996).

During the pre-teen years, it is not considered popular for a student to individually excel above others in an academic area. However, it is considered popular for students in teams, such as sports, to excel together as a team toward an athletic goal. In order for a teacher to gain more student engagement and motivation, they can capitalize on the "team" idea and the social characteristics of the students (Slavin 1996). Student groups can even come up with a team name so that their group can be addressed all together rather than each student individually (Webb, et al., 2004).

Because student engagement is vital to the CLTM, it is important for teachers to strategically arrange their lessons and activities so that students are working the entire class period. In a study conducted by Simonsen, et al., (2008), it is stressed that maximized instruction and arrangement of learning activities are essential for student engagement. These proactive classroom management practices and others, such as posting and reinforcing expectations, can decrease off-task behavior and increase student engagement.

**Student Behavior**

There are many behavioral management practices that can be used in the classroom, such as student voice, posting expectations, specific praise, behavioral contracts, and token rewards (Simonsen, et al., 2008; Flannery, 2008).

The CLTM is also an effective strategy in classroom management. In a research study conducted by Pate-Clevenger, Dusing, Houck, and Zuber, (2008), the researchers' purpose was to observe if cooperative learning in the classroom led to a decrease in off-task behaviors. In this study, "off-task" behavior was defined as "any time a student was not working on classroom
activities, demonstrated a lack of self-control, exhibited rude behavior, was poorly motivated, or any other social behavior that negatively impacted academic performance in the classroom” (2008, p.iii). In this study, there were four teacher researchers and 92 students that were studied. The methods used to collect data for this project were teacher surveys, student surveys, and behavior checklists. The quantitative data collected by the teacher researchers before cooperative learning was implemented indicated that 79 percent of students either agreed or agreed strongly that their own off-task behavior affected at least one of their grades. Teachers reported 165 incidents of off-task behaviors they observed in the classroom. The quantitative data collected after cooperative learning was implemented indicated that 85 percent of students either agreed or agreed strongly that cooperative learning helped them focus on the current assignment and teachers reported a decrease from 165 to 75 incidents of off-task behavior. The researchers concluded from this study that off-task behaviors were decreased after cooperative learning was implemented.

In order to implement the CLTM correctly into the classroom, it is important for the teacher to set up his or her classroom in a manner such that the students know exactly what is expected of them. Such structuring of the classroom may include methods, including discussions with students about what is necessary to have a positive classroom environment at the beginning of the year, having students discuss the expectations in groups, then posting the expectations in the room where students will see them. “Posting, teaching, reviewing expectations, and providing feedback are associated with decrease in off-task and disruptive behavior and increase in academic engagement, leadership, and conflict resolution” (Simonsen, et al., 2008, p. 368).

The CLTM focuses directly on students working together toward a common task as well as individually being held responsible for one part of the project or activity. For instance,
students may be putting together a presentation on a certain topic and are responsible for presenting the project as a group to the rest of the class. Students in each group work together and help each other to orchestrate the kind of presentation that they want to give. The individual accountability of each student takes place when each student is in charge of a certain piece that will go into the presentation (Loeser, 2008).

Because the cooperative learning format puts students in charge of their own learning and requires them to work together in order to finish an assignment, the CLTM can decrease off-task behaviors because there is an increase in student motivation and engagement as they interact with one another (Lin, 2006; Loeser, 2008; Slavin 1996, Webb, et al., 2003).

**Benefits of the Cooperative Learning/Teaching Model to the student on a personal level**

Because students can be more motivated and engaged towards their studies through the implementation of the Cooperative Learning/Teaching Model, they therefore may benefit personally through their own achievement, communication skills, and ownership of their work.

*Student achievement*

The CLTM is directly related to student achievement because it focuses on a student-centered learning environment rather than the traditional teacher-centered learning environment. In a student-centered learning environment, students are actively engaged in the subject matter through group collaboration. Students are responsible for meeting certain criteria in the class based on their learning ability and are consistently held accountable for their own progress. In the CLTM, teachers continually have students reflect on their cooperative learning group as well as self-evaluate their own learning (Lin 2006; Webb, et al. 2003). It is important for teachers to assess their students’ learning and help students understand how their group works together.
teacher can evaluate a group during a lesson or project, then have the group discuss how well they worked together (Johnson & Johnson, 1999).

Robert Slavin (1996) wrote an article summarizing research review of cooperative learning in secondary schools. In the article, he explains that 52 studies were conducted over a period of approximately four weeks in regular secondary schools to observe the effects of cooperative learning on student achievement. All of the studies compared the CLTM to traditionally taught control groups. In the studies, teachers and classes were either randomly assigned to CLTM or to traditionally taught control groups, or were matched based on predetermined achievement levels and other aspects. Out of the 52 studies that were conducted, 33 (63 percent) found that there was considerably greater achievement in the classes that used CLTM than the 3 studies of traditionally taught classes. It was also noted that 16 studies (31 percent) found no difference between the two teaching strategies.

Greater student achievement can occur when two factors of cooperative learning are present: group goals and individual accountability. One method to ensure these two factors is called Student Teams-Achievement Divisions (STAD). When using this method, students work in teams to learn the necessary material for a given subject. Team members work together to help each other learn the material. After the students have completed the learning requirement, the teacher then gives each individual a quiz or test based on the material that was recently reviewed with their team. Over the course of the unit, students compare their scores to their own previous scores to self-evaluate their progress (Slavin, 1996). Using this style of cooperative learning, students can be aware of their learning progression and can communicate with the teacher about their achievement throughout the course of the year.

*Communication skills*
Along with students becoming more aware of how they learn, students can also become more aware of how they communicate with others. By nature, the CLTM requires students to constantly communicate with each other about the subject topic that they are studying. Webb and Mastergoerge (2003) explain that students can learn from collaborative work by helping each other, recognizing misconceptions and inconsistencies between their answers and their teammates’ answers, observing each other, and learning different problem-solving methods for themselves.

As students collaborate with each other, their communication skills can improve because they may be in a situation that requires them to problem-solve in order to be successful in the activity they are doing. For instance, if a student recognizes that he or she needs help on a certain part of the project, they can politely explain to another student in their group that they do not understand. After they ask another student for help, that student can respond that they will help them and specifically ask what they do not understand (Webb, et al. 2004). This two-way communication is modeled by the teacher and practiced before students actually start their group work. That way, students will already know how to communicate with one another.

Again, when using the CLTM, it is important for teachers to have students reflect on how their group worked together as well as complete self-evaluations after each group activity so that they continue to focus on their own skills (Lin, 2006; Webb, et al. 2003).

Ownership and accountability

As students become more aware of their own achievement, they become more accountable for their own learning and therefore have more ownership in their work. The CLTM allows students to not only hold each other accountable for the activity or project that they are working on but to also hold themselves accountable for the information that they are contributing.
to the group as well as learning the information for individual tests and quizzes (Loeser 1998; Slavin, 1999).

Within cooperative learning, teachers can usually put the responsibility on the students' shoulders to complete a desired activity or project with their group. By doing this, students can become more skilled at communicating with each other, solving problems, and relating with people their own age with different perspectives in an academic environment.

Summary

Cooperative learning has been a successful teaching strategy within the educational world. The positive effects of the CLTM include improvements in student behaviors (Pate-Clevenger, et al. 2008), achievement, accountability (Gokhale,1995; Slavin 1996; Webb & Mastergoerge, 2003), communication skills, and relationships among individuals of different backgrounds (Lin, 2006; Loeser, 2008; Slavin, 1996; Webb, et al. 2004). The negative effects of the CLTM are important to consider, however, this teaching strategy is designed so that all students are involved and are successfully contributing to the group as well as excelling in their own learning ability. Teachers should be aware of these effects so that they can implement cooperative learning correctly into their own classroom (Loeser, 2008).

Teachers can also implement a safe and positive learning environment with the CLTM by modeling to the students, proper ways to communicate to each other. Teachers can purposefully arrange groups so that students in each group vary in ethnicity, gender, and learning ability so that they can become more comfortable working with peers that are different from them. Students then learn how to communicate with one another through practice, and then demonstrate positive and encouraging ways to communicate with one another as they work toward a common goal (Lin, 2006; Webb, et al. 2004).
Research indicates that classrooms with the CLTM have demonstrated an increase in on-task behavior, critical thinking, and self-evaluation. Students within a CLTM environment have verbalized that cooperative learning helped them become more on-task in the classroom, which in turn allowed them to be more successful (Gokhale, 1995; Pate-Clevenger, et al. 2008). Research has also shown that teachers have seen a decrease in disruptive behavior after the CLTM was implemented into their classroom (Pate-Clevenger, et al. 2008). With time and instruction maximized and students held accountable for a certain part of the group activity or project, students are generally better behaved because they know what is expected of them and are held accountable by their group members and by themselves to complete their part (Slavin, 1996).

The Cooperative Learning/Teaching Model has received positive reviews overall and can be a major contributor to increased student achievement, accountability, and positive behavior in the classroom. Cooperative learning not only allows students to be successful in their educational careers but can also allow them to become successful in the careers that they will go into as adults. Cooperative learning is a necessary component in teaching today’s youth, since it teaches students the skills necessary to work with other people and to take ownership in their achievements.
Chapter 3: Research Proposal

This chapter will be organized into four components: Research project purpose and questions; Subjects, participants, settings and confidentiality; Data collection and analysis; and Intervention Procedures.

Research project purpose and questions

The purpose of this study is to investigate the effectiveness of implementing cooperative learning in a seventh grade science class. The questions for this action research project are as follows:

1. How might cooperative learning be used to improve student engagement?
2. What are student attitudes toward cooperative learning as defined by cooperative learning jigsaw model?
3. How might the cooperative learning jigsaw model influence students' communication skills?
4. How should the cooperative learning jigsaw model be effectively implemented?
5. How might the cooperative learning jigsaw model influence student attitudes towards their peers?

Subjects, participants, settings, and confidentiality

Subjects and participants

I am currently a seventh grade science teacher at Chase Middle school in Spokane, Washington. I teach about 150 seventh grade students each day that are between the ages of 12 and 13. There are many varying abilities that I have observed among my students so far this year. I have five students that are English Learning Development (ELD) students from Burma. I also have two other students whose parents immigrated to the United States from Russia. These
students speak Russian at home and English at school. In my classes I have six students that have Individual Education Plans (IEPs) and work with a Special Education Case Manager throughout the day. Within these students’ IEPs, most of them are between a third and fifth grade reading level. They require more time to complete homework, classroom activities, and tests. I feel that about 15 to 20 percent of all my students are at a lower academic level, whether they have an IEP, limited or no family involvement, or lack the means to focus during a normal class period due to Attention Deficit Hyperactivity Disorder (ADHD). The other 80 to 85 percent I feel are average to above average students. Between the 150 students, I believe I have close to equal numbers of females and males; however, I have two classes that contain mostly male students. My students come from varying socioeconomic backgrounds. Chase Middle School houses students from low, middle, and upper class families and the classroom generally reflects these characteristics.

*Settings*

In my classroom, I have few yet concise guidelines for my students to follow. My guidelines are for students to respect each other and the learning environment, start and stay on task, come to class prepared, and try hard and have fun. My classroom discipline plan includes yellow behavior slips. These behavior slips are utilized to alert the student that the behavior they are exhibiting is inappropriate for the classroom environment. If a student receives a yellow behavior slip, they have to spend one minute after class writing an explanation of what their behavior was and how they can improve it. If a student continues to be disruptive after receiving a behavior slip, he or she will be issued a further consequence (lunch detention, call home, office referral) based on the magnitude of their behavior.
My classroom is set up so that students are sitting at groups in tables. There are usually four students per group. This seating order is usually random, based on students drawing a card with the number of a certain table, and changes twice per quarter so that students can get to know other students in the class. Because I teach science, the group setting for students is functional for the labs and hands-on activities that are done in a collaborative fashion.

Chase Middle School is influenced by a district-wide prescribed curriculum that is implemented by the teachers and staff and monitored by the administrators and academic coaches. Along with the prescribed curriculum, the teachers give district-wide mini-assessments to the students after completing each of the four units in the academic year. There are approximately three to four mini-assessments per unit.

Chase middle school only houses seventh and eighth grades, where there are about 820 students enrolled. Among these 820 students, about 40 percent qualify for the free and reduced lunch rate.

The professional community at Chase Middle School includes one Principal, one Assistant Principal, one Principal’s Assistant, academic coaches, teachers, teacher’s aides, and support staff. In our school there are four Spokane Education Association representatives, including myself. The parents at Chase involved in the Parent Teacher Group (PTG) hold monthly meetings at the school.

Chase Middle School is on the east side of the south hill in Spokane. The school fosters a learning environment for students from low, middle, and upper class families. The community around the school can be described as suburban due to new housing developments in immediate proximity to the school, however some neighborhoods close to the school were built between 1940 and 1980.
Confidentiality

Firstly, I will ensure student confidentiality by omitting their names from any document that is submitted for data collection and analysis. Because this project will also be used for the Professional Certification Program, I would like to use video and pictures of students working in cooperative learning groups as evidence. However, I will be sure to omit any name from videos or pictures so that the students' confidentiality will be maintained. Due to time constraints, I deleted this item from my implementation. Secondly, I will not be submitting any personal documents in regards to students' learning abilities, health, or other confidential information.

Methodology, Data Collection, and Data Analysis:

Methodology

This research project was an experimental design with both qualitative and quantitative data. The purpose was to determine if cooperative learning jigsaw model would influence student behavior, relationships, communication skills, and test and daily work scores.

Data Collection

The data I collected for this project included student surveys, student self and group evaluations, tabulation of yellow behavior slips, teacher, administrator, and academic coach observations and notes, and student daily work and test scores.

Students were surveyed before and after the cooperative learning model was introduced. I anticipated that I would survey the students before and after each time that I used the cooperative learning method through out the year. I had students evaluate themselves and their group after each time I used the cooperative learning method so that I could get a sense if students became more adapted to cooperative learning as it is was implemented through out the year.
During the course of this project, I tabulated the number of yellow behavior slips that were given before and after the cooperative learning jigsaw model was introduced. I kept an ongoing Excel spreadsheet of the number of yellow behavior slips that were given when cooperative learning was implemented compared to amount given after implementation.

I had anticipated taking video and picture observations of students working in cooperative groups, however I decided not to before I began the research project, thus not having any video or picture data to use for this project. I recorded my own notes and collected notes from administrator and academic coach observations as they related to cooperative learning in my classroom.

Finally, I collected student daily work and test scores before and after the cooperative learning jigsaw model was introduced. I also kept an ongoing spreadsheet of student test and daily work scores through out the year.

*Data Analysis*

In order to analyze the data that I collected for this project, I identified five research questions. The questions were related to student behavior, relationships, communication skills, and student test and daily work scores.

I surveyed my students before and after the cooperative learning jigsaw model was introduced. This was ongoing throughout the year, however there were times when students worked independently. The surveys focused on student opinions regarding the effectiveness of the cooperative learning jigsaw model through out the year. Students evaluated themselves as well as their groups. I organized these surveys into common themes that related to my research questions. This data was qualitative because I used student written responses to support my research questions.
The total number of yellow behavior slips was compared before and after the cooperative learning jigsaw model was introduced. I collected the behavior slips as quantitative data for this study. Like the student surveys, this was also on going through out the year. I kept a record of the number of behavior slips that were given to students when they were working independently or were receiving direct instruction compared to the number that were given when they were working in cooperative groups. My observations, along with administrator and academic coach observations, were qualitative data used to support other data that was collected during the course of this study.

Lastly, student test and daily work scores that I collected throughout the year served as quantitative data since student’s percentages were compared before and after the cooperative learning jigsaw model was introduced. I used a spreadsheet to compare students’ scores over the course of the year. I noted the difference in percentage scores before and after the cooperative learning jigsaw model was implemented.

**Intervention Procedures**

Because there‘is a process to introducing cooperative learning to students, I started the school year with preliminary activities, such as icebreakers, so students could meet and get to know each other. These activities served as groundwork for the cooperative learning jigsaw model, which was introduced later in the year. I chose to implement the jigsaw method because I felt it would be effective as a culminating group project, in which students would be held responsible for individual and cooperative parts of the assignment. The jigsaw method allowed students to individually choose a topic to research about the Spokane-Rathdrum Prairie Aquifer, however they were expected to contribute that research to their cooperative group. Each jigsaw
group was responsible for presenting group members’ work to the rest of the class by means of PowerPoint, poster, or any other approved method.

In order to reach a point where students could feel comfortable working with one another, I used the beginning of the year to introduce short-term cooperative learning activities, such as “Role-Play” and “Think-Pair-Share” (Lin, 2006; Loeser 2008).

Role-play, also known as “formal roles”, is a cooperative learning method where students in a group each have a specific job that is related to the subject material. For instance, the students were responsible for discussing a certain topic in their groups, one student was the organizer that kept the rest of the group on track, another student was the recorder, and another was the timekeeper. Each student had a specific role but was also responsible for contributing to the discussion that was taking place. The “Think-Pair-Share” method is a cooperative learning strategy used when a teacher wants the students to think about a certain topic or question independently, then pair and discuss their thoughts with another student, and finally share their combined thoughts with a bigger group or the rest of the class. I used both of the above cooperative learning strategies as a bridge to the more in-depth cooperative learning jigsaw method. (Lin, 2006; Loeser, 2008).

The jigsaw cooperative learning method is a strategy in which the teacher organizes the students into groups of about four students. These groups are called “home groups”. Each student in a home group is responsible for a certain section of a project that will ultimately be presented by the group. Each student is considered an “expert” in the topic that they learn about and contribute to the rest of the group. The teacher can have these students formulate groups, called “expert groups”, where the students who are responsible for the same topic in different groups gather together to help each other learn about their specific topic. Later, the teacher can
have the students go back to their home groups where they can then teach or contribute the information that they learned from the expert groups to their home groups (Lin, 2006; Loeser, 2008).

I implemented the jigsaw method into my classes during the second and third quarters of the school year. During the third quarter, the students studied earth science, learning about the water cycle, the Spokane Valley–Rathdrum Prairie Aquifer, and water contamination. Towards the end of the unit, students were responsible for designing a group project on the Spokane Valley–Rathdrum Prairie Aquifer. I used student-created rubrics from last year that reflected student beliefs of what was fair and equitable to all group members.

Before the students began the aquifer projects, I introduced proper communication and leadership skills that would be necessary for working in a group. I modeled these skills and had the students practice them before they began their projects. I had the students fill out a pre- and post-survey that measured their beliefs of group work before and after the jigsaw method was implemented. This was part of the quantitative and qualitative data I collected in relation to the research questions. At the end of the second quarter of the year, I recorded the number of yellow behavior slips that were issued during that quarter. I compared this quantitative data to the number of behavior slips and refocus forms I issued while the students worked in their cooperative learning groups during the third quarter. I also had a spreadsheet of student daily work and test scores that were used to compare the students’ scores before and after the jigsaw method was introduced.
Chapter 4: Data Report

Description

I conducted the cooperative learning research project over a two-month period from December, 2009 through January, 2010. During this time, students were surveyed, yellow behavior slips and refocus forms were compared, students were observed, and daily work and test scores were compared, before and after the implementation of the “jig saw” cooperative learning method.

In December, I gave all of my students a pre-survey on cooperative learning. Each student rated their experience from 1, strongly disagree, to 5, strongly agree, when asked specific questions about cooperative learning (See Appendix A). Also in December, the science coach and I observed six students for “on” or “off-task” behaviors as they worked in groups, before being taught cooperative learning techniques.

During the week of January 4th to the 8th, immediately after winter vacation, I had my students work in groups of threes or fours on a drinking water standards worksheet, however I still had not introduced the jigsaw method. As an exit task, I asked the students to tell me one thing they liked and one thing they disliked about working in groups that week. Most students indicated they worked well with their group members, however some students commented that some students “goofed off” or did not do their work (See Appendix B).

On January 11, 2010, I began teaching cooperative learning techniques to my students through active listening exercises. Students were numbered into random pairs in which they discussed their interests with each other. During the first exercise, one student talked for a minute while the other student listened. The student listening was not allowed to interject his or her thoughts, but was expected to make eye contact and show signs that they were listening, like
nodding or shaking their head. In the second exercise, students talked to each other about a life ambition that they had. During this exercise, the student listening was allowed to interject but only with positive feedback, like “that’s a good idea, but did you think of this?” The purpose of these exercises was to teach the students proper communication skills in order for them to understand positive and respectful ways to work in groups.

On January 14th, I distributed the aquifer project rubrics (see Appendix C) to the students and explained in detail the expectations of the project. Due to time constraints, I used rubrics that my students created last year. The rubrics included last year’s students’ ideas of fair and equitable criteria, such as all project information written in detail or students staying on-task and working positively with others. I explained to my students that they would use the jigsaw cooperative learning method for this project and would each be responsible for a certain topic on the Spokane Valley–Rathdrum Prairie Aquifer. Each student would research and answer a certain set of questions regarding the topic they chose, be responsible for sharing the information with the rest of their group, and would contribute to the creation of a final presentation. During this time, students completed an “Aquifer Expectations” form with their group of four members indicating each person’s responsibility for the project (see Appendix D). As I went over the rubrics with the students, I explained that they would be graded separately for the research they collected for the project, but together for the final presentation, in which groups could choose to make a PowerPoint presentation, poster, diorama, brochure, or any other approved method.

From January 14th to 26th, students worked on their aquifer projects. I supplied aquifer atlases, pamphlets, books, and computers for use. Some students checked out resources from the library and continued to use the Internet outside of school to conduct research on their topic. During this time, the science coach and I observed the same six students as we had in the second
quarter of the school year for “on” and “off-task” behaviors. We also collected qualitative data about these students’ interactions with their group as they worked on the project and when they gave their presentations.

After all of the students presented their project to the class, they completed a post-survey (See Appendix E) containing the same questions as the pre-survey they took in December. In addition, students were asked to give specific examples of their cooperative learning experience over the last few weeks. Like the pre-survey, I tabulated the quantitative data from the post-survey into a chart and created a graph to compare student responses from the second quarter to the third quarter. I also collected student responses later in the third quarter during the physics unit to compare student opinions about cooperative learning as they learned new material.

**Modifications**

During this research project, I made few modifications to the methods I had originally planned. Out of concern for student confidentiality, I decided not to use pictures or video to demonstrate cooperative learning groups. I chose to compare journal activities of students before and after implementing the jigsaw method, which would constitute as the “daily work” that I had indicated in the Methods portion of this report. Due to time constraints, I also chose to give students a pre-made rubric that was created by my students last year instead of having this year’s students create and vote on the rubric they liked best, which I had also anticipated in the Methods portion of this report.

Finally, during the third quarter, I began using refocus forms in lieu of the yellow behavior slips. Both forms are similar, however, other teachers and I began to use the refocus forms from the Time to Teach classroom management plan. Refocus forms were given to students after they had already been given a warning for an off-task behavior. Students would
take the refocus form (see Appendix F) to another teacher's room, complete the form, and return to class ready to participate. If a student continued to be off-task after they had been given a refocus form, they would be given a referral to the office. For the purpose of this project, I included the number of refocus forms in with the tabulation of yellow behavior slips.

**Data Analysis**

The data I collected for this research project included student pre- and post-surveys, observations of six students, anecdotal notes recorded by the science coach, the Principal’s Assistant, and me, student daily work and test scores, and continuous reflections from students regarding group work throughout the two month period that this project consisted of. My analysis of this data is divided into different sections, which include data tables and graphs, illustrating the data that was collected.

**Student Surveys**

The data tables below show the tabulated number of answers for questions 1 through 6 that the pre- and post-surveys consisted of. Below each data table is a graph showing the percentages of "Somewhat Disagree or Strongly Disagree" to "Somewhat Agree or Strongly Agree" answers for each question. As indicated in the data table, 85.5 percent of students said they "somewhat agree or strongly agree" with the first question, "I like to work with other students" before the jigsaw method was introduced. 78.7 percent of my students said they "somewhat agree or strongly agree" with the same question after the jigsaw method was used, a decrease of 6.8 percent.

Other percentages between pre- and post-survey data also decreased. In the pre-survey, 76.4 percent of students said they "somewhat agree or strongly agree" with the question, "I think group work can help me learn better", compared to 67.6 percent of students said they "somewhat
agree or strongly agree” to the same question, a difference of 8.8 percent. Even though the percentages for students who answered “somewhat agree or strongly agree” to questions 1 through 6 on the pre- and post-surveys were more than those that answered “somewhat disagree or strongly disagree”, the comparisons of the “somewhat agree or strongly agree” category between the two surveys showed a slight decrease in percentage.

Conversely, when asked if they felt cooperative learning helped them understand students of different learning ability, backgrounds, and culture, 75 percent of students answered somewhat agree or strongly agree in the post-survey compared to 44.5 percent in the pre-survey, a 30.5 percent increase.

Overall, 13.5 percent of students somewhat disagreed or strongly disagreed with cooperative learning according to the pre-survey, compared to 16.3 percent according to the post-survey. 64.3 percent of students somewhat agreed or strongly agreed with cooperative learning according to the pre-survey, compared to 60.9 percent according to the post-survey. The number of responses from students who were “not sure” increased in the post-survey compared to the pre-survey.
Data Table 1: Results of Cooperative Learning Student Pre-Survey

<table>
<thead>
<tr>
<th>Pre-Survey Questions</th>
<th>Pre-Survey Answers</th>
<th>Total Percent</th>
<th>Somewhat or Strongly Disagree</th>
<th>Somewhat or Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I like to work with other students.</td>
<td>4 4 10 42 64 124</td>
<td>6.5</td>
<td>85.5</td>
<td></td>
</tr>
<tr>
<td>2. I feel that all students are working to the best of their ability in groups</td>
<td>7 19 27 48 23 124</td>
<td>21.0</td>
<td>57.3</td>
<td></td>
</tr>
<tr>
<td>3. In groups, I feel that all classmates fulfill their responsibilities.</td>
<td>5 20 31 48 20 124</td>
<td>20.2</td>
<td>54.8</td>
<td></td>
</tr>
<tr>
<td>4. I think group work helps me understand students who are different from me.</td>
<td>2 3 12 44 62 123</td>
<td>4.1</td>
<td>44.5</td>
<td></td>
</tr>
<tr>
<td>5. I think group work can help me learn better.</td>
<td>7 5 17 35 59 123</td>
<td>9.8</td>
<td>76.4</td>
<td></td>
</tr>
<tr>
<td>6. Group work helps me maintain my attention longer.</td>
<td>14 11 15 51 32 123</td>
<td>19.5</td>
<td>67.5</td>
<td></td>
</tr>
</tbody>
</table>

Answer Code: 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Not Sure, 4 = Somewhat Agree, 5 = Strongly Agree

Graph 1: Results of Cooperative Learning Student Pre-Survey
Data Table 2: Results of Cooperative Learning Student Post-Survey

<table>
<thead>
<tr>
<th>Post-Survey Questions</th>
<th>Post-Survey Answers</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I like to work with other students.</td>
<td>5  2  19  45  51</td>
<td>78.7</td>
</tr>
<tr>
<td>2. I feel that all students are working to the best of their ability in groups.</td>
<td>6  22  44  34  17</td>
<td>41.5</td>
</tr>
<tr>
<td>3. In groups, I feel that all classmates fulfill their responsibilities.</td>
<td>3  16  37  42  20</td>
<td>52.5</td>
</tr>
<tr>
<td>4. I think group work helps me understand students who are different from me.</td>
<td>3  5  22  31  59</td>
<td>75.0</td>
</tr>
<tr>
<td>5. I think group work can help me learn better.</td>
<td>12  8  15  27  46</td>
<td>67.6</td>
</tr>
<tr>
<td>6. Group work helps me maintain my attention longer.</td>
<td>16  14  24  32  22</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Answer Code:  1 = Strongly Disagree,  2 = Somewhat Disagree,  3 = Not Sure,  4 = Somewhat Agree,  5 = Strongly Agree

Graph 2: Results of Cooperative Learning Student Post-Survey
In addition to tabulating student quantitative data from the pre and post survey, I also collected qualitative data from the responses the students gave in the post survey.

The table below is a compilation of different student responses.

**Data Table 3: Qualitative Responses from Post-survey**

<table>
<thead>
<tr>
<th>Question</th>
<th>Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I like to work with other students.</td>
<td>“If the students pull their own weight.”</td>
</tr>
<tr>
<td></td>
<td>“It helps me understand the science better.”</td>
</tr>
<tr>
<td></td>
<td>“Sometimes if other people don’t do well, I get a bad grade even if I do well.”</td>
</tr>
<tr>
<td>2. I feel that all students are working to the best of their ability in groups.</td>
<td>“Yes they can, but not always.”</td>
</tr>
<tr>
<td></td>
<td>“Not all students work well together.”</td>
</tr>
<tr>
<td></td>
<td>“Students know they have to complete their part so the group isn’t let down and work hard to see that doesn’t happen.”</td>
</tr>
<tr>
<td>3. In groups, I feel that all classmates fulfill their responsibilities.</td>
<td>“Everyone fulfilled their requirements.”</td>
</tr>
<tr>
<td></td>
<td>“In my aquifer group, some people didn’t complete everything but most did.”</td>
</tr>
<tr>
<td></td>
<td>“Some people get their work done but not all.”</td>
</tr>
<tr>
<td>4. I think group work helps me understand students that are different from me (learning ability, different culture, different background).</td>
<td>“Sometimes it helps, sometimes not.”</td>
</tr>
<tr>
<td></td>
<td>“I learned a lot about how people in my group act socially when working with each other and their ability to learn from and with each other.”</td>
</tr>
<tr>
<td></td>
<td>“I can get to know people more when I work with them and getting to know people more makes this class a better learning place.”</td>
</tr>
<tr>
<td>5. I think group work can help me learn better.</td>
<td>“I feel like it’s good to learn with students.”</td>
</tr>
<tr>
<td></td>
<td>“I do things faster and get an A without a group.”</td>
</tr>
<tr>
<td></td>
<td>“If someone helps me, I will understand more.”</td>
</tr>
<tr>
<td>6. Group work helps me maintain my attention longer.</td>
<td>“Yes, because people are depending on me.”</td>
</tr>
<tr>
<td></td>
<td>“Yes, if I work with someone I will keep my eyes on my work.”</td>
</tr>
<tr>
<td></td>
<td>“Group work generally keeps me more off-topic and allows me to be harassed more, in addition to getting less work done.”</td>
</tr>
</tbody>
</table>

**Student Observations**

Between the months of December, 2009, and January, 2010, the science coach, Principal’s Assistant and I observed different students before and after cooperative learning was implemented. Below is the tabulation set and data table of the compiled observations made by the science coach, the Principal’s Assistant and myself. “On-task” behavior consisted of
students working with a partner or group, working on the assignment or activity, talking positively with their partner or group members, and helping their partner or group members on the current activity or assignment. “Off-task” behavior consisted of students not working with their partner or group, not working on the assignment or activity, talking negatively with their partner or group members, and moving around the room with a disruptive purpose. Of the data we collected, I analyzed the results of six students in one class to conclude the differences in their “on” and “off-task” behaviors before and after the jigsaw method was introduced. The Principals Assistant observe eight different groups when she observed in December.

**Data Table 4: Tabulation of Student On and Off-task Behaviors**

<table>
<thead>
<tr>
<th>On-task behaviors</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working with partner/group</td>
<td>6 groups</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>2, 3, 5, 6</td>
<td>1, 2, 3, 4, 5, 6</td>
</tr>
<tr>
<td>Working on assignment/activity</td>
<td>6 groups</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>2, 3, 4, 5, 6</td>
<td>1, 2, 3, 4, 5, 6</td>
</tr>
<tr>
<td>Talking positively with partner/group members</td>
<td>6 groups</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>5, 6</td>
<td>2, 3, 5, 6</td>
</tr>
<tr>
<td>Helping partner/group members</td>
<td>6 groups</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>5, 6</td>
<td>2, 3, 5, 6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Off-task behaviors</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not working with partner/group</td>
<td>2 groups</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>1, 2</td>
<td>1, 2, 4, 6</td>
</tr>
<tr>
<td>Not working on assignment/activity</td>
<td>2 groups</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>1, 2</td>
<td>1, 2, 6</td>
</tr>
<tr>
<td>Talking negatively with partner/group members</td>
<td>1 group</td>
<td></td>
</tr>
<tr>
<td>students #</td>
<td>1,</td>
<td>2, 3,</td>
</tr>
<tr>
<td>Moving around room w/o activity in mind (disruptive purpose)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>students #</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Data Table 5: Student On and Off-task Behaviors

<table>
<thead>
<tr>
<th>Student #</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>on-task</td>
<td>off-task</td>
<td>on-task</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

From the data, an increase in both on-task and off-task behaviors was observed for students 2, 3, and 4 after the jigsaw method was introduced. On-task behavior increased for student 1, while his off-task behavior decreased, and students 5 and 6 had consistent on-task behavior, while their off-task behavior increased. To establish a fair analysis, I compared the data from December 11, 2009 to the data from January 14, 2010. Due to scheduling constraints, students were not adequately observed on the dates of December 10, 2009, January, 15, or January 20, 2010.

On December 10, 2009, the Principal’s Assistant observed six groups that exhibited on-task behavior and two groups that exhibited off-task behavior during one class period. At the time, the Principal’s Assistant did not observe individual students. During her observation, she explained that in six of the groups, students worked well together, sharing information, while students in the two other groups worked independently, not sharing information.

Disciplinary actions: yellow behavior slips, refocus forms, and office referrals

One of the last two sets of data was a tabulation of yellow behavior slips, refocus forms, and office referrals. During the second and third quarter, students were given yellow behavior slips or refocus forms to reflect on their off-task behavior and had an opportunity to correct that
behavior throughout the duration of the class. If a student chose to not correct his or her behavior, he or she received an office referral in the form of a lunch detention or an administrative meeting. The results of this tabulation can be seen in the data table below.

**Data Table 6: Tabulation of Yellow Behavior Slips, Refocus Forms, and Office Referrals**

<table>
<thead>
<tr>
<th>Discipline Action</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Behavior Slips</td>
<td>49</td>
<td>37</td>
</tr>
<tr>
<td>Refocus Forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Referrals</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

During the second quarter of the year, both yellow behavior slips and refocus forms were used, as I introduced the refocus forms during the end of the second quarter. In the second quarter, 33 yellow behavior slips and 15 refocus forms were given to students to correct their off-task behavior, which is a combined total of 49 yellow behaviors slips and refocus forms. During the third quarter, students completed only refocus forms, as the yellow behavior slips were phased out. There was a total of 37 refocus forms for the third quarter. The number of office referrals decreased by half from the second quarter to the third quarter resulting in eight students receiving referrals in the second quarter and four students in the third quarter.

**Student Daily Work and Test Scores**

Student daily work and test scores from the second quarter to the third quarter of the year were compared and analyzed. I compared the work students completed in their journals and two different district tests before and after the jigsaw method was implemented. Below is a data table of those scores.
Data Table 7: Student Daily Work and Test Scores

<table>
<thead>
<tr>
<th>Daily Work (Journal) Average</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>83.4</td>
<td>82.7</td>
</tr>
<tr>
<td>Test Score Average</td>
<td>80.8</td>
<td>79.4</td>
</tr>
</tbody>
</table>

The daily work scores of my students decreased from the second quarter to the third quarter of the school year by .7 percent and their test scores decreased by 1.4 percent. I collected and analyzed the scores of students’ science journals, which constituted the “daily work” for this research project. During the second quarter, students’ journal assignments consisted of labs related to earth science, such as the drinking water quality lab, exploring sensory thresholds lab, and national drinking water standards table activity. During the third quarter, students’ journal assignments consisted of labs related to physics, such as the wave generator lab, sound stations, and light and color lab. The Spokane School District tests analyzed were the Water Unit test, during the second quarter, and the Physics Unit tests, during the third quarter.

Inferences

Based on the data I collected before and after I implemented cooperative learning jigsaw model in my class, I have come to the conclusion that cooperative learning is effective in the classroom environment but should not be the only teaching strategy used throughout the school year. The jigsaw method was effective in the way it allowed for students to get to know each other better, work with each other towards a common goal, learn about different backgrounds, learning styles, and interests, and for most students, take responsibility for their own learning. The jigsaw method was not effective for students in groups in which one or more individuals would not take responsibility for their own part.
**Student Surveys**

Even though students were graded individually on their portion of the project, those who chose not to do their part seemed to create anxiety for the other students in their group. For instance, in an exit task, one student wrote, “My thoughts on group projects are that it was a little bit nerve racking to rely completely on someone to get their research done. It was also unpleasant trying to keep working with someone when they refused to do anything”. Another student commented, “I know I won’t always have a good cooperative group but the methods and skills I learned from this will help when I have a not so good groups” (See Appendix G). From these comments and the student surveys, cooperative learning seems to be a method that most, but not all, students are comfortable with (See data tables 1 – 3).

**Student Observations**

Based on the data collected from the observations of students before and after the jigsaw method was implemented, on and off-task behaviors did not change drastically. For one student, the aquifer project helped focus his attention on a specific topic, causing the off-task behavior to decrease. Unfortunately, this student was absent the day his group presented and only handed in half of the required work. Other students who were observed showed an increase in off-task behavior, however they were able to complete their entire responsibility for the project as well as present with their group. Because students may learn at different rates, a modified curriculum during cooperative learning may be useful in order to help those that do not work as fast as others as well as help those who work faster than their group members.

*Disciplinary actions: yellow behavior slips, refocus forms, and office referrals*

During this research project, the disciplinary actions I used when students were off-task decreased. I found that I did not need to give students refocus forms as often in the third quarter
as I had given yellow behavior slips and refocus forms in the second quarter. Because of the
group dynamics of cooperative learning, some students felt more pressure to complete their part
of the project when in a group or felt that they could maintain their attention longer when
working with another student (See data table 3). Students who did not enjoy working in
cooperative groups expressed that they worked better individually.

The refocus forms could have been a more effective discipline strategy compared to the
yellow behavior slips. The refocus form removed the student from the classroom to assess their
off-task behavior, thereby decreasing the chance for that student to disrupt others in their group.
When a student felt ready to rejoin his or her group, they were made aware that the next
disciplinary step would be a referral to the office.

During the third quarter, I found that I did not send as many students to an administrator
with an office referral. This may have been a result in the refocus disciplinary measures that
were used in which a student would automatically be sent to the office if he or she had already
completed a refocus form. The refocus disciplinary strategy was also being used by other
teachers in the school and may have been a better reinforcement for self-assessing behavior than
the yellow behaviors slips.

Student Daily Work and Test Scores

As I compared student daily work scores and test scores between the second the third
quarters, I was surprised to see that they both decreased. Even though the overall average of my
students' daily work and test scores seemingly did not change, I was still interested in why the
scores decreased.

One factor to consider while comparing second to third quarter daily work and test score
data is the changes in curriculum from earth science to physics. From my experience, the
physics curriculum usually contains more difficult concepts than the earth science curriculum. In
the physics unit, students are learning new concepts such as energy transfer, frequency, and
wavelength. In the earth science unit, students are building on previous knowledge they already
learned such as the water cycle and concentration. Even though the majority of students
appreciated cooperative learning in the classroom, I think they may have had more of a personal
difficulty with the physics unit than the earth science unit.

Another factor to consider when comparing student daily work and test scores is the
change in seating arrangement that occurred halfway through the third quarter. The majority of
students expressed an approval for working in cooperative groups, however the change of group
members may have caused some uncertainty among students as they worked on physics labs and
activities. This may have caused the decrease in daily work and test scores. During the time of
this study, I did not realize the impact the seat change might have had on cooperative learning
groups as I was simply comparing non-cooperative teaching strategies to the cooperative
learning jigsaw method. Next year, when I use the jigsaw method and other cooperative
learning/teaching models, I will be mindful of these effects on students.

After completing this study, I was able to compare the aquifer district test scores from
last year’s students to this year’s students. My students from last year scored an average of 66.7
percent on the aquifer district test compared to my students from this year that scored an average
of 78.2 percent. It is important to take into consideration any revisions made by the school
district in an effort to make the test more appropriate for seventh grade students. However, I do
think the 11.5 percent increase from last year to this year can be attributed to the better
implementation of the cooperative learning jigsaw method through the knowledge and
experience I gained through out this project.
The refocus forms may also have been a positive contributor to higher student achievement on the aquifer test from last year to this year. The elimination of disruptions from the classroom environment may have increased the ability for students left in the classroom to retain more of the subject matter. Students who completed refocus forms seemed to return and work cooperatively at a faster rate after being in another teacher’s room. This also may have contributed to an increase in student understanding during the aquifer unit this year.

Overall, the inferences that I have made about cooperative learning in the classroom are positive. The majority of students articulated they feel they learn better, understand differences among their classmates, and maintain their attention longer in groups. Observations of students illustrate that most groups work well with each other. Even though some students’ off-task behavior increased, according to individual observation, the number of yellow behavior slips, refocus forms, and office referrals decreased over the second and third quarter of the year. Student daily work and test scores decreased over the course of this research project, however the difference did not exceed two percent and factors such as curriculum difficulty and cooperative group changes were taken into consideration. My reflections for this research project are directly related to the data I have collected, the inferences I have made based on this data, and the experiences I had while implementing the jigsaw method in my classroom. These reflections can be found in chapter five of this paper.
Chapter 5: Reflections

When I began this research project, I felt cooperative learning would be the solution to the issues I faced in my classroom in regard to student motivation, participation, acceptance, and ownership. In the literature, I found other accounts in which cooperative learning was an effective strategy when used properly in the classroom. Cooperative learning can allow students to work together in a safe and positive learning environment while taking responsibility for their learning and acknowledging the differences in each other (Lin, 2006, Loeser, 2008; Slavin 1996; Webb, et al. 2003). Even though the majority of my students either somewhat agreed or strongly agreed with the main ideas of learning in cooperative groups, I found that I became concerned with those that did not agree. I am encouraged that most of my students did well with the jigsaw method and had positive experiences, however, my goal is to focus on the group of students that did not have positive experiences.

During my research, I felt that I had implemented cooperative learning productively to my students. The listening strategies taught early in the third quarter were effective because the students learned how to talk with each other in a supportive and constructive way. Because of the adolescent age, students seemed to feel self-conscious when practicing the different listening activities, however, I do think they were able to learn valuable communication skills. One student said, “I liked this activity because it was different and I learned new things about someone.” Another student commented, “I told my partner that I wanted to start a talk show some day and she suggested that we both start it together.”

I also felt that the implementation of the jigsaw method was effective in which students understood their responsibilities as individuals and as group members. Many of my students had questions on the day I introduced the aquifer project rubrics. Individuals that were normally
high-achievers were concerned whether their grade would be affected if another student did not do their work. Other students were concerned about the final product and what they would do if someone in their group was absent the day of the presentation. Because of these concerns, I used the entire class period to discuss different matters with my students in regards to the expectations of the aquifer project. By the end of the period, most students understood their responsibilities and began discussing the different topics that they would each choose and the type of presentation they would be giving as a group (See Appendix D).

One improvement I would make to the jigsaw method would be to create modified rubrics in which students would have a choice of different projects related to earth science. For the last three years, I have concentrated cooperative learning around the aquifer project. Next year, I would like to offer my students multiple topics to research within the earth science unit, such as the water cycle, aquifer, water contamination, and aquatic habitats. This may help those students who are not completely interested in the aquifer choose a subject they would be more interested in, therefore becoming more invested in their own learning. Like certain classes I have taken at Eastern Washington University, I would group students into similar interest groups and use the jigsaw method as the cooperative learning strategy.

Another improvement I would make would be to combine students into groups of two or three members instead of four. During my research, I found that students in groups of four would tend to have more off-task behaviors than those in groups of three. Due to student numbers, I sometimes had groups of three instead of four. These students seemed to have an easier time focusing on their topic and less distractions. My goal for this improvement would be to decrease off-task behavior while increasing student participation and motivation.
After reading different literature and conducting my own research, I believe that cooperative learning will be an effective strategy for me to use in my middle school science classroom, however I do not think it will be a strategy that I will use one hundred percent of the time. From the student surveys, observations, discipline forms, and grades, I can conclude for myself that cooperative learning is a method that may satisfy the learning styles of those students who are social, mature, or collaborative. For students who are introverted, immature, or independent, the cooperative learning strategies were more difficult. Cooperative learning can be beneficial for any type of learner as it focuses on relationships, understanding differences, and contribution to a group, however I do not think it would be beneficial to use on a daily basis.

Throughout my six years of teaching, I have found the most effective strategies are those that are used sporadically, such as direct instruction, cooperative learning, student voice, and inquiry. A combination of these and other teaching strategies throughout the school year may be the most beneficial for students as their different learning needs are met. With this research project and with the discoveries I continue to make in my career, my goal is to use what I have learned and apply it to the students I teach each year in a way that is most beneficial for them.
References


Felder, R. M., Brent, R., & North Carolina State University, Raleigh Dept of Chemical Engineering. (1994). *Cooperative learning in technical courses: Procedures, pitfalls, and payoffs*


Appendix A
Group Work Student Pre-Survey
(December 2009)

Please answer the following questions honestly and to the best of your ability.
Circle a number that reflects your opinion:

1 = Strongly Disagree
2 = Somewhat Disagree
3 = Not Sure
4 = Somewhat Agree
5 = Strongly Agree

1. I like to work with other students.
   1  2  3  4  5

2. I feel that all students are working to the best of their ability in groups.
   1  2  3  4  5

3. In groups, I feel that all classmates fulfill their responsibilities.
   1  2  3  4  5

4. I think group work helps me understand students that are different from me
   (learning ability, different culture, different background).
   1  2  3  4  5

5. I think group work can help me learn better.
   1  2  3  4  5

6. Group work helps me maintain my attention longer.
   1  2  3  4  5
Please answer the following questions honestly and to the best of your ability. Circle a number that reflects your opinion:

1 = Strongly Disagree  
2 = Somewhat Disagree  
3 = Not Sure  
4 = Somewhat Agree  
5 = Strongly Agree

1. I like to work with other students.

   1  2  3  4  5

2. I feel that all students are working to the best of their ability in groups.

   1  2  3  4  5

3. In groups, I feel that all classmates fulfill their responsibilities.

   1  2  3  4  5

4. I think group work helps me understand students that are different from me (learning ability, different culture, different background).

   1  2  3  4  5

5. I think group work can help me learn better.

   1  2  3  4  5

6. Group work helps me maintain my attention longer.

   1  2  3  4  5
Group Work Student Pre-Survey
(December 2009)

Please answer the following questions honestly and to the best of your ability. Circle a number that reflects your opinion:

1 = Strongly Disagree
2 = Somewhat Disagree
3 = Not Sure
4 = Somewhat Agree
5 = Strongly Agree

1. I like to work with other students.
   
   1 2 3 4 5

2. I feel that all students are working to the best of their ability in groups.

   1 2 3 4 5

3. In groups, I feel that all classmates fulfill their responsibilities.

   1 2 3 4 5

4. I think group work helps me understand students that are different from me (learning ability, different culture, different background).

   1 2 3 4 5

5. I think group work can help me learn better.

   1 2 3 4 5

6. Group work helps me maintain my attention longer.

   1 2 3 4 5
Appendix B
Doing a good job on the N.D.W.S.
National Drilling Safety Standards.
Is it a big project?

We got our work done. We're working some people better. Some people need more feedback. The group worked together really well and we took care of any concerns.

I thought the group worked really well, and I acted as the go-to person for some stuff, and got more familiar with everyone.
Appendix C
Aquifer Project Rubric

<table>
<thead>
<tr>
<th>Basic Information</th>
<th>6</th>
<th>12</th>
<th>18</th>
<th>24</th>
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<tbody>
<tr>
<td>Only one criterion is</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>included.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than half of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>criteria included.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not all criteria included and/or descriptions are not in detail.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Includes most of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>required criteria in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>detail.</td>
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</table>

<table>
<thead>
<tr>
<th>Map of the Aquifer</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes map but</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>does not include all</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>three criteria.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Includes map but may</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>have two criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>missing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Includes map but may</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>have one criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>missing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Includes all criteria.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| More Specific           |    |    |    |    |
| Information             |    |    |    |    |
| Only one or two         |    |    |    |    |
| criteria are included.  |    |    |    |    |
| Less than half of       |    |    |    |    |
| criteria included.      |    |    |    |    |
| Not all criteria included and/or descriptions are not in detail. |    |    |    |    |
| Includes most of        |    |    |    |    |
| required criteria in    |    |    |    |    |
| detail.                 |    |    |    |    |

<table>
<thead>
<tr>
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Aquifer Project Group Participation Rubric

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Appendix D
Aquifer Group Project Expectations

For this project, you will work with your group to create an aquifer project that will be presented to the rest of the class. Your aquifer project will be due Thursday, January 21st (at the beginning of class!!). Each member of the group will be responsible for obtaining different kinds of information for the project and each person will share the responsibilities in putting the project together. Your group may choose how you want to present the information. Students in the past have created posters, pamphlets, or PowerPoint for their project.

Below, you will need to indicate the information each person in your group is responsible for.

Basic Information/Map of the aquifer: ____________________________

More Specific Information: ____________________________

Aquifer Pollution: ____________________________

History of the Aquifer: ____________________________

(If your group only has three people, split the last section three ways)

Below, please indicate what part of the project each person is responsible for (example: Jane will create slides 1-4 of the PowerPoint).

Title - all 1-3 + subtitle for ____________________________
+ subtitle ____________________________ 7-9 + subtitle ____________________________
10-12 + subtitle, bibliography by all ____________________________

Grading:
Your project will be graded based on the rubric that I have given you. You will self-evaluate your project after you have finished so don’t lose the rubric!! I will also evaluate your group’s project when you are finished for your final grade. Each person in the group will be graded depending on how they contribute to the group as well as how they work in the group (remember your communication skills!) so your individual grades may be different.

The most important thing is that you are learning new things and are getting along with your group!! Good luck and have fun!
Aquifer Information to be included in your Project

Basic Information -

What is an aquifer?

Where does the water come from?

Direction of the aquifer's flow

Where is the aquifer located?

Who uses the water from the aquifer?

Map of the aquifer -

Include major landmarks (ie: Downtown Spokane, South Hill, I-90, Spokane Valley, Coeur d'Alene, Sandpoint, Spokane River)

Direction of the aquifer's flow (use arrows)

Boundaries/Location of the aquifer

More Specific Information -

How much water is there?

How fast does it travel?

How is the water used?

How deep is the aquifer?

What exactly is the aquifer made up of?

Can you see the aquifer anywhere? Where?

How does the water get out of the aquifer and to our houses?
**History of the Aquifer**

1. **How was the aquifer formed?** The Spokane Aquifer began when water from the Columbia River and underground springs formed a vast underground water reservoir. Over time, the aquifer became a critical water source for the region.

2. **What is the aquifer made of?** The aquifer is composed of layers of sand and gravel that were deposited over time. These layers allow water to move through the ground.

3. **What is the significance of the aquifer?** The aquifer is one of the largest in the world and provides drinking water for millions of people. It is also a source of water for irrigation and industrial use.

4. **How deep is the aquifer?** The depth of the aquifer varies depending on the location, but it can be several hundred feet deep in some places.

5. **How can we protect the aquifer?** Protecting the aquifer involves minimizing pollution, conserving water, and preventing over-extraction. This includes proper disposal of waste, reducing water use, and supporting policies that protect the aquifer.

We live, work, and play over our drinking water. Help us protect it.

---

**Spokane Aquifer**

- **What is the Spokane Aquifer?** The Spokane Aquifer is a vast underground water reservoir that provides drinking water for millions of people.

- **Where is the Spokane Aquifer located?** The Spokane Aquifer is located in the Spokane Valley, Washington.

- **How deep is the Spokane Aquifer?** The depth of the Spokane Aquifer varies depending on the location, but it can be several hundred feet deep in some places.

- **What is the significance of the Spokane Aquifer?** The Spokane Aquifer is one of the largest in the world and provides drinking water for millions of people. It is also a source of water for irrigation and industrial use.

- **How can we protect the Spokane Aquifer?** Protecting the Spokane Aquifer involves minimizing pollution, conserving water, and preventing over-extraction. This includes proper disposal of waste, reducing water use, and supporting policies that protect the aquifer.

---

**Conclusion**

The Spokane Aquifer is a precious resource that we must protect for future generations. By working together, we can ensure that this vital water source remains clean and available for all.
The Spokane Aquifer

By Group 7

Basic Info
MORE INFO

How much water is there?

- In the entire aquifer, there is 10 trillion gallons.

- How fast does it travel?
- The water flows 50 feet per day.
• How is the water used?

  - We use the water when we water our lawn and take showers. That water comes from the aquifer.

• How deep is the aquifer?

  - The aquifer is 50 feet deep, depending on the ground.

• What exactly is the aquifer made of?

  - It is made up of water, rocks, and soil.

• Can you see the water anywhere?

  - If you go to the Spokane valley and when you get to the top you will see the aquifer.
What are the threats to our aquifer?

- Pollutions are getting into the aquifer mainly from septic tanks and from storm water runoff from streets

- What can regular people do for the aquifer?
- To keep our aquifer clean people should not dump pain on the ground, and things that can hurt us through water.

What can Washington/Idaho do to protect our aquifer?

- To try not to get gasoline, zinc, and mercury into the water.

- What problems/contaminates has the aquifer had in the past?
- Lead has leaked into the aquifer, along with typical cleaning and painting supplies: brake cleaner, paint thinner, etc.
History of The Aquifer

How was the Aquifer Created?

- Glaciers moving from Canada into Washington made ice dams that filled with rain water, there was a crack in the glacier and when water flowed through it, it caused the glacier to melt, leftover sediment created the aquifer.
Identify any major past polluters of our Aquifer. Location?

-Major contaminants are:
  * Septic Systems
  * Improper Construction of pipes

^ this could be very dangerous because toxic things could be in them and if there was a leak it would go into the Aquifer

- I do not know any locations

😊 The End 😊
Appendix E
Please answer the following questions honestly and to the best of your ability. Circle a number that reflects your opinion:

1 = Strongly Disagree  
2 = Somewhat Disagree  
3 = Not Sure  
4 = Somewhat Agree  
5 = Strongly Agree

1. I like to work with other students.

1  2  3  4  5

Please give an example. It helps me understand the science better.

2. I feel that all students are working to the best of their ability in groups.

1  2  3  4  5

Please give an example. Not all students work well together.

3. In groups, I feel that all classmates fulfill their responsibilities.

1  2  3  4  5

Please give an example. I'm just not sure.

4. I think group work helps me understand students that are different from me (learning ability, different culture, different background).

1  2  3  4  5

Please give an example. As I said in #1, that I learn science better.

(over)
5. I think group work helps me learn better.

1 2 3 4 5

Please give an example. Yes it does, I feel like it's good to learn with students.

6. Group work helps me maintain my attention longer.

1 2 3 4 5

Please give an example. Yes if I work with someone I will keep my eyes on my work.
Group Work Student Post-Survey
(January 2010)

Please answer the following questions honestly and to the best of your ability. Circle a number that reflects your opinion:

1 = Strongly Disagree
2 = Somewhat Disagree
3 = Not Sure
4 = Somewhat Agree
5 = Strongly Agree

1. I like to work with other students.

   1   2   3   4   5

Please give an example.
Doing the Aquifer Project I had a good learning experience while working with others.

2. I feel that all students are working to the best of their ability in groups.

   1   2   3   4   5

Please give an example.
Students know they have to complete their part so the group isn’t let down and work hard to see what doesn’t happen.

3. In groups, I feel that all classmates fulfill their responsibilities.

   1   2   3   4   5

Please give an example.
In my aquifer group some people didn’t complete everything but most did.

4. I think group work helps me understand students that are different from me (learning ability, different culture, different background).

   1   2   3   4   5

Please give an example.
I learned a lot about how people in my group act socially when working with each other and their ability to learn from and with each other.

(over)
5. I think group work can help me learn better.

1 2 3 4 5

Please give an example.
I can learn strategies from people in my group

6. Group work helps me maintain my attention longer.

1 2 3 4 5

Please give an example.
Sometimes the group got off task but still we focused primarily on the project.
Group Work Student Post-Survey
(January 2010)

Please answer the following questions honestly and to the best of your ability.
Circle a number that reflects your opinion:

1 = Strongly Disagree
2 = Somewhat Disagree
3 = Not Sure
4 = Somewhat Agree
5 = Strongly Agree

1. I like to work with other students.
   1  2  3  4  5

Please give an example.
I work well with other students because

2. I feel that all students are working to the best of their ability in groups.
   1  2  3  4  5

Please give an example.
I somewhat agree with this because while some

3. In groups, I feel that all classmates fulfill their responsibilities.
   1  2  3  4  5

Please give an example.
See example #2

4. I think group work helps me understand students that are different from me
   (learning ability, different culture, different background).
   1  2  3  4  5

Please give an example.

I agree with this because you can observe how they research and interact with others
how different they are from me and their different learning styles.
help me learn better.

1 2 3 4 5

Please give an example.

see example #1

6. Group work helps me maintain my attention longer.

1 2 3 4 5

Please give an example.

I agree with this because if I am working solo, I might get halfway through my work, but then my attention wanders, but if I am with a group, I stay focused.
Appendix F
focus

Suggested time 5-10 minutes...
Time leaving ____________________________
Name ________________________________
Teacher who sent me ____________________

1. What was my behavior?

2. What did I want?

3. How did this make my teacher feel? How did this make my classmates feel?
My teacher probably felt ________________________________
My classmates probably felt ______________________________

4. What problem(s) did my behavior cause for me, my classmates, and/or my teacher?
__________________________________________
__________________________________________
__________________________________________

5. How do I plan to change my behavior for the future?
__________________________________________
__________________________________________

6. Am I ready to go back to class?
☐ YES  ☐ NO
You are being warned and will spend extra time after class. On the back of this slip, write what your behavior was and what you could do to improve.

If your behavior improves and is acceptable for the remainder of class, there will be no further discipline. Just hand the slip to Mrs. Douglas on your way out.

If your misbehavior continues I will sign this slip and you will get to:

☐ Spend 15 minutes at lunch detention.
☐ Spend 30 minutes at lunch detention.
☐ Spend lunch with you, or time after school to discuss the problem.
☐ Call a parent so I can talk with them on how best to improve your behavior.
☐ Be referred to the administration.

If you would like to discuss this warning, you may meet with me after class or after school and talk about the situation.

---

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- Spend 15 minutes at lunch detention.
- Spend 30 minutes at lunch detention.
- Spend lunch with me, or time after school to discuss the problem.
- Call a parent so I can talk with them on how best to improve your behavior.
- Be referred to the administration.

If you would like to discuss this warning, you may meet with me after class or after school and talk about the situation.
1. What was my behavior? I was talking and I was not supposed to.

2. What did I want? I wanted to talk.

3. How did this make my teacher feel? How did this make my classmates feel?
   My teacher probably felt angry and frustrated at me.
   My classmates probably felt feeling they could not learn.

4. What problem(s) did my behavior cause for me, my classmates, and/or my teacher?
   They could not learn and I was of task.

5. How do I plan to change my behavior for the future?
   I will not talk to my friends.

6. Am I ready to go back to class? ☑ YES ☐ NO
focus

Suggested time 5-10 minutes...

Date: 1/13/09
Period: 4

Teacher who sent me: Mrs. Douglas

1. What was my behavior?
   - got a pen, because I was being disruptive

2. What did I want?
   - to get my pen back

3. How did this make my teacher feel? How did this make my classmates feel?
   - My teacher probably felt>' bad because I was disruptive
   - My classmates probably felt:
     - nothing

4. What problem(s) did my behavior cause for me, my classmates, and/or my teacher?
   - She had to stop what she was doing

5. How do I plan to change my behavior for the future?
   - I do not know what I did
   - is disruptive and next time I will wait

6. Am I ready to go back to class?
   - [X] YES     [ ] NO
Appendix G
I think the co-operative Acquirer Projects overall was a good learning experience because it improved my group learning skills. I think that it went well because the people in my group knew that our grade was individual but we still had to work together to improve and create the project. I know I won't always have a good co-operative group but the methods and skills I learned from this will help when I have a not so good group.

The raindroplets gather on bits of dust.

My thoughts on group projects are that it was a little bit nerve-racking to rely completely on someone to get their research done. It was also unpleasant trying to keep working with someone when they refused to do anything. It was nice not having to do everything on my own.