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Learning and Serving: An Exploratory Action Research Case Study of a Middle School Service Learning Curriculum Project

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LEARNING AND SERVING:

AN EXPLORATORY ACTION RESEARCH CASE STUDY OF A MIDDLE SCHOOL

SERVICE LEARNING CURRICULUM PROJECT

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Abstract

Service learning, a natural link between community service and standards-based education, encourages students to learn about themselves in the context of the world in which they live. In other words, service learning is a method of teaching that enriches learning by engaging students in meaningful service to their schools and communities, and integrating that service with established curricula or learning objectives (NYLC Service-Learning Glossary, 2005). Educational service activities can be done directly or indirectly and they can have a varying degree of "involvement" ranging from community service, community exploration, community action or advocacy and research. In this study, a service learning project at a rural middle school was evaluated. The project was a result of a response to a community need and was seen as a way to reinforce academic skills for an entire 5th grade class.

The purpose of this study was to describe a middle school service learning project and its influence on student learning and empowerment. Gender differences for both of these areas were also considered. Specifically, the study looked at three areas: academic gains, overall perceptions about the project and students' perceptions about making a difference in their communities. In order to do this effectively, middle level learning, motivation, engagement and student voice, as they pertain to the students' sense of empowerment in helping a community, were taken into account.

This was a mixed methodology case study and a pragmatic approach to this analysis was used, where the quantitative data (from surveys) revealed some of the initial information and then qualitative elements from the surveys, journals and observations were added to offer support for the statistical findings.

Almost all groups made gains between the pre-survey and post survey on hunger awareness and fraction concepts, but it is impossible to know if those gains were due to the service learning project or other factors. On-task behaviors, as a measurement of project engagement, were examined and were high for most parts of the project as well.

Most students stated that they had a positive service learning experience (91%) and that they felt they could make a difference in their community (91%). To evaluate these findings further, analyses were performed that looked at responses to journal prompts and other open-ended questions.

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Chapter 1: Introduction and Literature Review

It all came to me on an early morning jog, something I don't afford myself the time to do very often. Listening to a burly coach shout out instructions to a young child as he attempted to swing at a softball, I saw the determination in his eyes, which seemed to mimic my own. The child swung the monstrous wooden bat and I heard a faint crack, signaling success, before trotting to my destination: a dark green, deciduous forest that framed a fast moving creek. The sharpness of fresh cut grass morphed into a relaxing pine scent and I felt a sense of calmness wash over me. As I clued into my senses, my dissertation about service learning came into focus. This project was a study and will, of course, be presented as such. But it was also a meaningful reflection into the heart of service learning: I needed to take all of the data pieces and reflect upon them using a methodology that replicated all of the components of service learning that make this form of learning so unique. It is from this thought process that the study finally began to fall into place.

In the age of the standards based movement and high stakes testing, the emphasis on student achievement is stronger than ever. At the same time, the incidences of bullying and school violence are increasing (Pellegrini, 2002) while civic engagement and awareness is decreasing (Conrad & Hedin, 1991). At middle schools, where students grapple with shifting identities, peer relations and hormonal changes, the school climate needs to support positive student growth that encourages more than just academic

success- students need to feel empowered in their own learning (Jackson, Davis, Abeel, & Bordonaro, 2000). Service learning, a natural link between community service and standards-based education, strives to fill this niche by encouraging students to learn about themselves in the context of the world in which they live. In other words, service learning is a method of teaching that enriches learning by engaging students in meaningful service to their schools and communities, and integrating that service with established curricula or learning objectives (NYLC Service-Learning Glossary, 2005). Educational service activities can be done directly or indirectly and they can have a varying degree of "involvement" ranging from community service, community exploration, community action or advocacy and research. In this study, a service learning project at a rural middle school was evaluated. The project was a result of a response to a community need and was seen as a way to reinforce academic skills for an entire 5th grade class.

Need for Study

Numerous studies have shown that service learning has had a strong impact on high school and college age students' attitudes towards school and their community (Elmer, 2002; Henderson, Brown, Pancer, & Ellis-Hale, 2007; Jensen, 2006; Rice & Brown, 1998; Welch & Billig, 2004). Yet, special attention needs to be paid to early adolescents as they develop beliefs that directly affect their middle school experiences and serve as a foundation for choices they will make as active, global citizens in high school, college and beyond. There are few studies on middle school service learning, but this kind of exploratory, experiential, and hands-on learning reflects the essence of the middle school philosophy as outlined in *This We Believe*, a position paper first published by the National Middle School Association in 1995 and then updated in 2003 (*This We*

Believe, 2003). The report highlights fourteen "cultural characteristics" and "school practices" that are the basis for "successful" middle schools. From this list, two characteristics ("active learning" and "school initiated partnerships") and three practices ("organizational structures," "multiple learning and teaching approaches," and a "relevant, challenging, integrative, exploratory curriculum") fit into the service learning context. Students who participate in such projects respond to a community need through direct service. In order to do so, a plan of action is created, the plan is implemented using skills learned in the classroom, and students then use problem solving techniques to reach their goals. The project used in this study encouraged students to actively respond to a media driven request for help at a new, local food pantry. Through a coordinated effort, students were asked to learn about hunger and then help the food pantry meet its need through the understanding of marketing practices and computational math skills. *This We Believe* (2003) states that through the implementation of innovative strategies like advisory, exploratory and transitional programs, interdisciplinary teaming and varied instruction, students' interest in school increases and they are intrinsically motivated to become more active in their learning. Yet even though this philosophy is widely used in middle school circles and it has a natural connection to service learning, (which can be woven into any of the strategies named above), the effects of service learning have not been a strong research focus. This current project attempted to address a gap in knowledge of how service learning impacts younger students. The nature of the current research is exploratory, and can perhaps serve as a starting point for larger and more comprehensive studies.

By meshing academic concepts with service, one middle school study entitled, "The Relationship of Service-Learning Project Models to the Subject-Matter Achievement of Middle School Students" done by Katherine Dewsbury-White fifteen years ago served as the inspiration for this research. That study was conducted over the course of fifteen days and Dewsbury-White found that students who voluntarily participated in off-campus service trips or chose to participate in extra service activities were more aware of the hunger issues that were studied than students who did neither of these volunteer activities (1993). Creating a similar project that was short-term, and did not require travel or excessive funds, was important for assessing the value of service learning. This is because the intent to create meaningful learning experiences and help students become intrinsically motivated global citizens plays an important role in middle school education (Jackson et al., 2000; *This We Believe*, 2003), but I wanted to see if such a short-term project would have as many positive outcomes as the ones featured in Kathy Dewsbury-White's research over fifteen years ago. Time and access to resources are issues in many educational settings so creating a project worthy of study, which could then be easily executed and replicated elsewhere, was desirable.

Statement of Problem

Many students in today's United States' schools are under a great deal of pressure. Some spend their days glossing over topics in the rudimentary subject areas, a trend fueled by state-mandated high-stakes testing and the perceived need to get into a reputable college or university (Easterbrook, 2004; Koetting, 1988; Rivera, 2006). While these efforts are put forth to meet the criteria set by No Child Left Behind (NCLB) guidelines, other important educational issues may not be taken into account. As policy

makers address the achievement gap with special attention on reading, writing and arithmetic, other areas are being neglected (Chapman, 2004; Darling-Hammond, 2007). Students spend less time casually socializing during recess or free periods and fine arts and physical education classes have been cut from many public schools' curriculums in an effort to raise standardized test scores. Furthermore, the opportunities for students to engage themselves in co-curricular activities that then lead to meaningful discussions have all but disappeared as funding for such programs has dwindled ("Instructional Time in Elementary Schools: A Closer Look at Changes for Specific Subjects," 2008; Rothstein, 2008). The implementation of NCLB left me wondering about the purpose of education and asking questions. Children are being schooled, but are they really being educated? Are they intrinsically motivated to learn? Do students have a true voice in their own learning? Do they feel like they can make a difference in their communities? Do boys and girls learn differently, and if so, should they be taught or educated differently? It is possible that that the impact of NCLB is swinging the educational pendulum too far (Dillon, 2009; Sanchez, 2006). It might best be summed up as, "today, more than ever, schools must help youngsters develop the skills and attitudes needed to work for justice-not just the skills needed to pass an examination" (Nathan & Kielsmeier as cited in Kraft & Kielsmier, 1995; p.71)

Service learning helps address some of these concerns. It incorporates many of the key traits of learning that make up the current middle school philosophy, including cooperative learning, integration, hands-on and "life-enriching" activities (Mizelle, 1995 as cited in Camblin, 2003). When service learning is put into the context of a required, yet integrated and choice driven subject area, it may have the potential to bring all of the

core middle school philosophy pieces together to give students a meaningful, educational experience.

A major emphasis on school reform in the past twenty-five years supports the need to bring service learning into schools. Several critical reports, including *Turning Points 2000* released by the Carnegie Council on Adolescent Development and *This We Believe*, have shifted educational thinking and paved the way for meaningful learning experiences, especially at the middle school level. *This We Believe* emphasizes the need for quality programming that allows students to explore their changing identities and educational interests. The paper states, "Students are curious about the world and their place in it, and [educators] understand that students thrive when engaging in genuine activities that make a difference in their schools and communities" (*This We Believe*, 2003; p. 14). Therefore, service learning provides a way to meet the changing educational needs of today's youth. Even though the outcomes of service-learning research are often inconclusive, it is a creative way to impact today's youth by giving them a voice in meeting their learning objectives and helping them become more civically aware, global citizens.

Rationale

Over the years, service learning has taken on many forms, but its various definitions have made it difficult to study. Furthermore, much of the existing research pertains to high school and higher education: little evidence of its impact exists at the middle school level. All of these issues, plus the lack of research at the middle school level, have encouraged me to do an in-depth evaluation of service learning in this setting. Doing the present case study is an effective way to do this since, "case study is the study

of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (Stake, 1995; p. xi). Even though the results from this study can not be generalized due to the size of the population and the nature of it, it is still my hope that the information will open the doors for a larger-scale service learning study at the middle school level.

Purpose of Study

The purpose of this study was to describe a middle school service learning project and its influence on student learning and empowerment. Gender differences for both of these areas were also considered. Specifically, the study looked at three areas: academic gains, overall perceptions about the project and students' perceptions about making a difference in their communities. In order to do this effectively, middle-level learning (i.e. learning for middle school age students), motivation, engagement and student voice, as they pertain to the students' sense of empowerment in helping a community, were also focal points of the study. Furthermore, since research suggests that boys learn differently than girls, gender differences were also evaluated. As schools try to understand the impact that service learning can have on a school environment, an evaluation of all of these characteristics may provide insight into the value of such a program at the middle school level.

Research Questions

The following questions are the focus of the research:

1. Did students learn about hunger awareness and fractions from this service learning project?

2. How do students feel about their service learning experience?

3.   What were students' feelings about the project and whether they can make a difference in their community?

4.   Are there differences in how male and female middle school students perceived and participated in the service learning project?

The Researcher

I have spent my entire adult life as an educator. I was a student in public and private educational settings, and I have spent my career in both kinds of environments as well. I have worked with special populations in various contexts (residential therapeutic camps for at-risk teenagers, schools for special education students and in a gifted and talented classroom) and in the general education classroom with children between the ages of nine and eighteen. For the past eleven years, I have held several different teaching positions and driven buses for the school used in the study. These collective experiences have given me the time and opportunity to learn and observe in many situations. Over time, I have developed an ability to watch and reflect upon the various behaviors of the students around me. I have tried hard not to judge what I see. Rather, I try to just merely take it all in, process it and use it to develop my teaching strategies.

      Researcher bias.

I am also a proponent of service learning. Until high school, I attended a school that valued a "learning by doing" approach. I found that what I learned in this context stayed with me much longer and had a more direct impact on my life than the information I was required to glean from textbooks and lectures in my traditional high school. Yet I was unaware of what this kind of experiential learning was called until I attended a national service learning conference nine years ago. I have been testing it out with various student groups and in my classroom ever since. I had no empirical, first-hand

evidence that service learning was an effective way to teach apply academic skills or increase student empowerment, but intuitively, I sensed that it has real merits at the middle school level. Exploring the impacts of it using a systematic research process let me see if my intuition was correct for a small group of fifth grade students in a very specific context.

I have taught in the school used in this study for over a decade and it is also the place where I spent my own middle school years. I have seen service learning conducted on a very superficial level, where a group of 10-12 mixed grade level students spend a day learning about a community need and then completing a project to support it. Several teachers have also developed a more in-depth service learning project which involved students spending up to two years in a fully-integrated classroom learning with the intent of helping others. Yet, I wanted to see how one carefully planned service learning project affected an entire grade level of students since this kind of evaluation had never been done at the school where I teach. "Service based activities" are currently named in the School District's "Life Skills Ends Report. This report, which states desired learning outcomes for all students in the District, reads, "Throughout the system there are many service based activities that assist students with meeting the goals identified as part of the Life Skills" (End 3: Life Skills, 2009). I was curious to see if it deserved as much attention as it receives in this report.

Definition of Terms

Below is a list of terms and their definitions (as taken from a dictionary unless otherwise noted) as they are used throughout the study:

Consumer math

A conceptual framework that emphasizes reasoning and application for how fractional numbers and basic computational skills are used to understand basic marketing practices, budgeting and taxes.

Empowerment

A student's positive feeling or sense of power about their role in making a difference in a community. This is measured by dichotomous and open-ended response questions on survey and in journals.

Engagement

The act of a person being drawn in and involved in an experience or activity. It is measured by responses in project journal, and time-on-task and comments during observations

Middle School

This typically refers to a setting where "Middle School Philosophy" is used to educate 6th, 7th and 8th students. In this case, 5th grade is also included. Aside from spending most of the academic day in self-contained classrooms, 5th grade students are treated as middle school students and participate in activities with students in the other grades (including involvement in a multi-age advisory program) on a regular basis.

Motivation

This pertains to a person's desire to do something and is measured by completing activities in project journals and time-on-task during observations

Reflection

A written or verbal activity that encourages students to think about what they have experienced and/or learned.

Service learning

A method of teaching that enriches learning by engaging students in meaningful service to their schools and communities, and integrating that service with established curricula or learning objectives (NYLC Service-Learning Glossary, 2005).

Self-efficacy

"People's judgments of their capabilities to organize and execute courses of action required to attain designed types of performances." (Bandura, 1986 as cited in Rouxel, 2000; para. 8). This term is referred to several times throughout the study in relation to student's perception about making a difference in their community, but is not specifically measured.

Student voice

A students' ability to decide what is educationally significant to them and then to make decisions about how to meet those educational goals.

Literature Review

Introduction.

There are several fundamental issues that make the results of service-learning research controversial and hard to generalize beyond the studied population. One of the most persistent problems is the lack of a universally accepted definition of service learning, which then leads to multiple programmatic implementations and resulting outcomes. At least two hundred definitions have been used in recent published research (Jacoby and Associates, 1996 as cited in Furco, 2003). One program's emphasis may differ dramatically from another's and thus make programs difficult to compare. This problem is stated repeatedly (Chapin, 1999; Furco, 2003) and can be very problematic for

all service-learning research. An optional versus mandatory project, the length of a

project, and reflective practices at the end are just some of the factors that can impact the

outcomes of a service-learning effort. Even disagreements about service-learning's

educational place (is it a program, a theory, a philosophy or a pedagogy?) and its name

(*service learning* is often used synonymously with *experiential learning*, *community*

service and *internships*) have caused problems (Billig, 2000). Considerable credit for

service-learning's roots is given to Dan Conrad and Diane Hedin for their landmark

research on "experiential learning" (1982) and then "community service" (1991), but the

way in which the terms were used interchangeably during the 1980s and 1990s still

continues today.

History of service learning.

While service learning, as it currently exists, is a fairly recent educational

pedagogy, it has strong philosophical foundations from the debates of Socrates,

Descartes, Hume and Kant (Crosby, 1995) and then, more significantly, in educational

thought from the early 1900s. Arthur W. Dunn was instrumental in the foundation of

civic education when in his book, *The Community and the Citizen* (1907), he emphasizes

one's responsibility to his community and within his community. At approximately the

same time, John Dewey, who is frequently cited as one of the forefathers of service

learning, often spoke of the interconnectedness between individuals and society in his

many published reflections. He spoke of education providing the "map" for a meaningful

experience that could open a child's eyes to other significant experiences. He also

stressed that experiences had to occur both within and outside of the classroom in a way

that could encourage a child to interact with his community (Dewey, 1902). The value

that Dewey placed on the connection between lessons learned within a school setting and how they are shaped and influenced by experiences in the outside world provided a strong basis for later school-to-community efforts.

In the years that followed, the easiest and most effective way to tie the school with the community was through the social studies and civics curriculum. Experiential learning activities pertaining to government and civics education thrived, especially in high schools (Hepburn, 1997). In learning about how government works, students began to find their voice and open their eyes to issues that mattered to them and their community. In New York City, for example, students saw a need to push for increased public safety. Just as is currently done today, the students researched the problem, created a viable set of solutions, and then presented their plan to local authorities and eventually the state legislature (Hepburn, 1997). While this whole concept was called "community service," the learning component of this project would now place it under the "service learning" umbrella instead.

In the 1970's the idea of community service and learning evolved into "experiential education" and "internships" at about the same time that people started withdrawing from community life (Conrad & Hedin, 1991). It was not unusual for high school students to engage in projects that allowed them to replace traditional classes with learning opportunities in work settings. As a way to communicate what was learned, these students typically had to keep a daily or weekly reflective journal about their experiences. Sometimes extra workshops and/or readings were assigned to substantiate the internships. Similarly structured leadership opportunities were popular as well: selected students would participate in workshops, shadow government leaders and give

final presentations that would synthesize the learning (Hepburn, 1997). Again, all of these experiences would now be defined as service learning.

Even though the value of experiential learning was apparent to government officials, the amount of time, energy, and money needed to sustain and grow such programs came into question in the early 1980's. Political agendas and financial concerns got in the way of meaningful progress in the field until later in the decade when civic apathy increased enough for key politicians to become concerned. The introduction of video games, home videos and cable television drew people back into their homes and into themselves. Essentially there was much less civic engagement and this was part of the impetus that pushed the service-learning movement forward towards the end of the 1980s. Suddenly service oriented education programs shifted to the forefront in political circles and bipartisan support increased (Hepburn, 1997). President George H. Bush signed the National and Community Service Act into law in 1990, which provided services and funding for K-12 and postsecondary programming, and President Clinton followed this up with the National Service Trust Act in 1993 with similar authorizations (Johnson & Notah, 1999).

With funding and educational support in place, many schools began to make service a mainstream part of their curriculum. Mandatory service requirements for high school graduation came into practice, but not without controversy. Dismayed parents and students tried, unsuccessfully, to sue school districts for having to perform mandatory service for a graduation requirement based on their interpretation of the 13th Amendment's reference to "involuntary servitude" (Johnson & Notah, 1999). As a result, the idea of mandatory service has raised many questions and concerns about the purpose

of service learning and the potential coercive factor that may be at odds with the meaning of community service. Nevertheless, according to a report distributed by the National Center for Education Statistics in 1999, over 80% of public high schools in the United States offered community service opportunities, and of this number, 46% offered service-learning opportunities as well. A subsequent National Household Education Survey of 7,913 6th-12th grade students revealed that 19% of the subjects were required to participate in service in their schools (Kleiner & Chapman, 2000).

As of 1998, there were efforts to legitimize service learning even more through research, so that funding and support continued (Making the Case for Service Learning: Action Research and Guidebook for Teachers, 1998) and those efforts continue today (Service Learning Resources and Support: Facing the Future, 2010). There is a fair amount of research on service learning, but a significant portion of it pertains to high school and postsecondary settings, and there are few findings that can be generalized. Consequently, national organizations are now trying to draw data together and offer needed support for the long-term sustainability of service learning in education. Most notably is the multi-year research initiative, "Growing to Greatness" (G2G), commissioned by the National Youth Leadership Council and State Farm Companies Foundation. In one of the latest reports from 2006, surveys revealed that 66 % of US public schools were "engaged in community service" and 28% were engaged in service learning, which is curriculum based, has clear learning objectives, and meets community needs" (Service Learning by the Numbers, 2006; p.vi). While it is not clear, tightening NCLB regulations and more refined definitions of "community service" and "service learning" may be responsible for the decline in reported participation from the previous

decade. It seems that service within schools is still being taken seriously, but sound research looking at service-learning's academic credibility is still needed to keep the momentum going, especially in elementary and middle schools. Seeing if young students can benefit from the outcomes of service learning may add credibility to the field.

Service Learning and Middle School

There is considerable information to suggest that service learning is developmentally appropriate and a good learning strategy for pre-adolescents. It is heavily emphasized in *Turning Points 2000* and *This We Believe*, but evidence suggests that even young students can start to look beyond themselves. According to Jean Piaget's (1977) child development model, children ages 7-11 are in a "Period of Concrete Operations," which makes it possible for students to think logically and be less egocentric than in previous stages. The next stage, the "Period of Formal Operations," impacts children from the ages of 11-15 when students are becoming more logical and are able to think more abstractly (Piaget, 1977). Since the 5th graders used in this study are on the cusp of both operational stages, students are starting to think beyond themselves and are ready to process some of the global issues that both directly and indirectly impact them. More importantly, students at this age can begin to use information to formulate their own opinions and decide what action to take in certain situations. Exposure to social issues through exploratory activities can help enhance this process.

Erik Erikson had a similar developmental theory. He, too, believed that development was divided into stages, but he also firmly believed that the impact of life experiences were irreversible and could not be erased (Erikson, 1968). This could have both positive and negative implications in one's life and on one's value system since

teens "are developmentally programmed (a) to seek unique identities, (b) to somehow try to make a difference, not just here and now, but from a wider social perspective in the future and in history, and (c) to search for something to be faithful to- an ideal, an idea, a task, another" (Juhasz, 1982; p. 444). Therefore, incorporating service learning into a school curriculum may positively impact subsequent choices that students make once the project is over.

This We Believe emphasizes the need to reexamine the middle school philosophy with regard to overall student achievement. The suggested approach is multifaceted and thus takes into account the varying educational needs of pre-adolescents. One aspect of the report refers to middle school philosophy by stating that successful middle schools should have "multiple learning and teaching approaches that respond to their [sic] diversity." (2003; p. 7) Service learning and community service are then named as successful ways to achieve these ends, but few of the cited references pertain to student empowerment from service learning projects. There is some evidence that supports other effects like individual attitudinal shifts and social development (Conrad & Hedin, 1982; Hamilton & Fenzel, 1987), but more emphasis is needed on the impact that such projects can have on helping students take control of their own learning and feel that they can make a difference in the world around them.

Empowerment and student voice.

Several attributes of service learning include its ability to empower students, promote student voice and help students develop a sense of self-efficacy or a feeling that their efforts are making a difference. Part of the goal in experiential learning, and thus service learning is to "empower rather than hold power over" (Warren, 1995; p. 250), but

this can only be tested if quality service projects are created and implemented by the

students who feel that what they are doing is important. Fertman, White and White

reinforce this by saying:

> Developing a culture of service and providing frequent feedback opportunities for
> students to apply what they are learning to real world situations provides them
> with a creative and useful vehicle for recognizing that they can make a difference
> (1996, p. 13).

Another way of viewing this is that teenagers need the opportunity to develop

independence and explore their personal interests so that they develop a genuine curiosity

about the world (Fertman et al., 1996. These ideas also fit in with Erikson's theory on

adolescence since middle-school aged youth are trying to figure out who they are and

then are trying to make a difference in a broad social arena (Juhasz, 1982). Because

service-learning projects, in their purest form, are intended to be brainstormed, planned,

implemented and reflected upon by students, the end result is that students have a say in

their learning, a stronger sense of empowerment, and at least in one case, greater

academic success (Scales, Blyth, Berkas & Kielsmeier, 2000; Morgan & Streb, 2001).

A student's ability to make decisions about educational experiences and goals,

otherwise known as "student voice" is strongly embedded in service learning. Without

this key component, service learning may not have the same impact on students because

the element of choice, and therefore buy-in, is taken out of the learning process.

Furthermore, "if students do not have a voice in the activities, they apparently do not

connect with them" (Morgan & Streb, 2001; p. 170). Dating back to 1900, John Dewey

spoke about the value of student voice in education. He stated:

> There is all the difference in the world between having something to say and
> having to say something. The child who has a variety of materials and facts wants

to talk about them, and his language becomes more refined and full, because it is controlled and informed by realities…It can be done in a *related* [sic.] way, as an outgrowth of the child's social desire to recount his experiences and get in return the experiences of others, directed always through the contact with the facts and forces which determine the truth communicated (1900, p. 67.)

The emphasis on the word "related" has taken on a new meaning in today's educational circles. A relatively new movement in high school reform focuses the significance of the 3 Rs: rigor, relevance and relationships. "Related," as it is written in Dewey's work, fits into the context of "relevance" quite strongly and is showing some promising positive correlations with healthy brain activity and engaged learning (Daggett & Nussbaum, 2008). It is also being substantiated by other findings by Maehr and Midgley who emphasize the need to make learning tasks "meaningful, challenging, interesting and important (1991). Allowing students the opportunity to decide what is important and relevant in their lives helps them achieve learning goals.

Student voice through reflection is a very important part of what makes service learning different from other forms of community service (Fertman, White, & White, 1996) . Community service and experiential education often emphasize the need for active engagement in community, but rarely does this include opportunities for students to spend quality time reflecting on their learning and contributions. In fact, according to Janet Eyler and her evaluation of several students' service-learning experiences, the kind of reflection and amount of time devoted to it matters (1993). Asking basic questions about what is learned and the overall meaning of the experience "helps [students] link what they have learned with what they have done. Without reflection, students would probably just go through the motions of service, cognitively unaffected by the experience, with their personal ignorance and biases either reinforced or unexamined" (Fertman et al.,

1996, p.33) Therefore, cursory reflective experiences that do not give students a chance to discuss their service projects candidly and thoroughly may impact learning outcomes. Eyler and Giles also mention the impact that quality reflection can have on critical thinking, "issue identification," problem solving and "openness to new ideas" (Eyler & Giles, 1999). These are traits that are highly emphasized in educational reform as well, especially in reference to the use of Bloom's Taxonomy for higher order thinking (Clark, 2004). Journals and discussions are common reflective practices for service-learning projects that promote this kind of thinking.

While not specifically linked to service learning, the emphasis on personal goal setting in order to increase student achievement falls into this same category- if students do not take personal interest in their learning by setting goals that are meaningful and relevant to them, they may not connect to the learning outcomes as strongly as they otherwise could (Ames, 1992; Marzano, Gaddy, & Dean, 2006). According to Robert Marzano, when students can give thought to where they are and then lay out a plan to where they want to go, achievement improves dramatically. While service learning is not specifically mentioned, the connectedness to learning is implied in students' work through the idea that goals need to be personalized and relevant to individual interests and learning outcomes (Marzano et al., 2006). This is substantiated by other research as well. Carol Ames found that students who have a voice in their learning and can articulate how they want to achieve certain goals develop a strong sense of personal responsibility and become independent thinkers as they strive to master content (Ames, 1992). Other studies stress the need to make goals "task oriented" as opposed to "ability oriented, " with a strong element of student choice so that students are engaged and

authentically motivated (Anderman & Midgley, 1998; Maehr & Midgley, 1991). Again the idea of "relevance" or "relatedness," as emphasized in service-learning pedagogy, is actively implied.

One middle school study, connecting student empowerment to service learning, was performed by Alice Terry (2003) on gifted students. While she found that students felt empowered as they did their projects, they typically needed a fair amount of guidance and feedback to keep a project going. The students clearly felt the value of what they had done, but "empowerment during the service-learning project seemed to stop at the school doors" rather than carry over into other parts of their lives (2003; p.303). According to Terry, this may be due to an adolescent's focus on self and their frequent need to seek approval.

In *Turning Points 2000: Preparing American Youth for the 21st Century*, the need to look beyond the books for ways to help youth develop their intellectual, social and emotional capacities through service learning, not just community service, is highlighted. Amongst other things, the report stresses the need for schools to establish "partnerships" or collaborations with community organizations in an order to make meaningful, lasting connections and create a culture of service (2000). When students are engaged in this type of educational experience, the learning comes alive because strong connections are made between what is learned in a classroom and what is happening in the outside community. Giving learning a strong contextual meaning not only helps students feel that their academic efforts make a difference, but also that they can take control of their learning in ways that regurgitating information from a textbook does not support. The key to making an impact, according to a study performed on eighth graders by the Search

Institute, is to create a quality program. In the study, students who performed more than 31 hours of service a year and were given ample opportunity for reflection were more interested in other classes. The service also changed the way students thought about others and may have dramatically improved their sense of being able to make a difference in their communities. (Scales, 1999).

Student Engagement and Motivation

A major concern for today's youth is their perceived lack of civic awareness and engagement. Media influences and a shift towards the "me" mentality have negatively impacted voting rates and a willingness to volunteer in the past several decades (Conrad & Hedin, 1991). Furthermore, even though states are emphasizing civic education in theory, it is still one major academic area that is not part of high-stakes testing in many states. Several studies have evidence supporting how service learning increases social responsibility and civic engagement (Hamilton & Fenzel, 1987; Melchior, 1999), but there are others showing mixed results, especially when civic engagement beyond the scope of a particular project is brought into question (Johnson & Notah, 1999). According to work by Rutter and Newman (1989) and another one performed by Conrad and Hedin (1982) the key to their significant findings about civic engagement may be attributed to the reflective practices that occurred after each project. According to these results, taking the time to discuss the outcomes and effects of a service-learning experience are critical to positive and lasting impacts so they are a focus of this current study.

Being actively involved in a community is not only the basis of service learning, it is also the foundation of a democratic society. Making this connection for students

when they are young may make a difference on how civically engaged they are as adults (Morgan & Streb, 2001). Clark and Croddy found few Americans who, when asked to describe their high school civics and government course, could do so with enthusiasm or link the school experience with active civic involvement (1997). Therefore, service learning offers an authentic way to apply fundamental civic lessons to the world outside of the classroom, thereby making the learning come alive in real-world contexts. While the positive outcomes of these kinds of educational experiences seem obvious, the research does not conclusively support it. Aside from other methodological issues, this could be due to the lack of longitudinal studies that do not look beyond isolated service learning experiences. Unfortunately, this current study will not add to the longitudinal perspective, but the focus on a measurable academic change at a middle school level may inspire a more in-depth study in the future.

Engagement as a factor that promotes learning is another area of consideration and its importance for middle school age students was noted in an earlier section. Evidence suggests that students who persevere with a task and "block out distractors" can maintain cognitive engagement, and therefore perform better than students who struggle with these skills (Corno & Mandinach, 1983). Furthermore, research shows that, students who were motivated to learn the material (not just get good grades) and believed that their school work was interesting and important were more cognitively engaged in learning and trying to comprehend the material" (Pintrich & DeGroot, 1990; p.37). The value of a task is something else that seems to matter (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). If students think the task is worthwhile and are confident in their ability to succeed, they will perform better.

Studying motivation in isolation is very complex. There are so many factors that play into a student's willingness or desire to learn and attempting to factor out control variables, that make findings more clear, is difficult to do. The findings from a case study of undergraduates who participated in several different class-oriented, service-learning projects revealed that the difference between extrinsic motivators versus intrinsic motivators (also classified as *inter*personal and *intra*personal motivators) may have skewed the initial results since one student's desire to get a high grade in the class may have led to the same outcome as another student's natural curiosity to learn in terms of the final products needed to meet the requirements of the course. It was only through a more thorough evaluation and a deeper look at the reflective pieces of the project (journals, observations, discussions, maturity levels, overall interest in project) that the differences in motivation became more apparent (Elmer, 2002). In another case study of high school students, motivation levels were determined by time spent on task using common observational techniques. While this kind of research strategy adds a quantitative element to the results, it still has a subjective quality about it since "time on task" can have many different interpretations (Jensen, 2006). Another study analyzed motivation by comparing attendance rates of a service-learning experimental group to a control group (Soslau & Yost, 2007). While this is by far the most objective way to look at student motivation, it seems that certain nuances are dismissed. Because of all of these findings, a mixed methodology seemed appropriate for this particular study.

Another motivational consideration should be the idea of mandated versus voluntary service learning or community service. Approximately one-fourth of American high schools and even the whole state of Maryland have service requirements for high

school graduation (Keilsmeier et al., 2004 as cited in Henderson, Brown, Pancer, & Ellis-Hale, 2007), but mandating service may impact motivation and thereby make it more difficult to authenticate. To complicate things further, the regularity of service activities probably plays a role in motivational outcomes as well: even if students are initially motivated to partake in service activities by extrinsic rewards (can't graduate without the service hours), their intrinsic motivation may increase over time if their service time genuinely becomes something they love to do. This theory was tested on several groups of Canadian high school students who had a service requirement for graduation. It was determined, through quantitative measures, that duration of service had no impact on one's willingness to volunteer, but these results do contradict findings from another study so further investigation is needed (Henderson et al, 2007). In this current study, all participants participated in a mandatory service-learning project. However, students who chose to extend their service time were given an opportunity to do so through their participation in the "service committee." In order to ensure that all students had an equal opportunity to participate, all service activities were conducted during school hours. Various lunch time activities are a regular part of every school day, but all attempts were made to open up these opportunities to any boy or girl who had a desire to be a part of the service committee.

Gender and achievement.

Achievement gaps are a major issue in educational reform and learning differences between boys and girls are a primary focus. One theory suggests that boys and girls experience different cognitive processing, especially with working memory and this can, in turn, impact achievement (Hamilton, 2008). There is also evidence that other

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biological factors play a role as well: the increased size of the corpus callosum and hippocampus in girls, along with a more active prefrontal cortex and stronger neural connectors in the frontal lobe make language-oriented subjects easier for girls (Gurian & Stevens, 2005). This may explain why there were more than two times the number of boys than girls who received an "unsatisfactory" on the 2009 Colorado Student Assessment Program test, otherwise known as CSAP (CSAP Writing Grades 3-10 Performance Levels, 2009). On the flip side, the results from the Third International Mathematics and Science Study (TIMSS) that measured gender differences in performance for 4th-12th grade students revealed that boys are better math and science students in most countries that were evaluated, especially in advanced level classes (TIMSS 1995: Gender Differences in Achievement, 1995). This may due to the different ways in which boys and girls solve problems: Girls have better spatial abilities, but they may rely more heavily on learned computational strategies than boys do in advanced problem solving situations (Hamilton, 2008).

Between the 1970s and mid 1990s, girls' educational experience was a concern in gender studies. Title IX initiatives and reports about girls falling behind boys in academic achievement (American Association of University Women, 1992) all point to these concerns about girls and learning. Now, however, boys are the focus: even though they have the ability to do well in certain subjects, they are falling behind girls in many ways. Boys receive much lower grades, have more discipline problems, have a much higher high school drop-out rate and they are 40% less likely to go to college (Gurian & Stevens, 2005). What is the problem? One theory suggests that less blood flow in the brain may lead boys to "compartmentalize" their learning (Havers, 1995 as cited in

Gurian & Stevens, 2005) and less serotonin may cause boys to be more restless (Gurian & Stevens, 2005). With this in mind, elements were included in the current service learning project that would appeal to boys' natural learning style. These included the opportunity to move around, the use of manipulatives to learn academic concepts, and the acceptance of an uncontrolled learning environment (both in the classroom and in the grocery store) at times.

Beyond the biological differences, there may be some significant environmental ones as well, especially in relation to boys and literacy. Ralph Fletcher (2006), a well-known children's book author researched the issues with boys and writing. He found numerous factors that could contribute to boys literacy issues in school including engagement, handwriting, choice and use of humor in writing. Michael Gurian (2005) referred to some of the same things when he wrote that, "…the sit-still read-your-book, raise-your-hand-quietly, don't learn-by-doing-but-by-taking-notes classroom is a worse fit for more boys than it is for most girls" (p. B1). Fletcher notes that, "we may favor one gender over another (2006, p.22) and this may become even more evident in the way that relationships develop between female teachers and boys. In his research, Fletcher asked a question to this effect on a survey that he gave to 100 teachers throughout the United States. About half of these teachers stated that they were "sex blind," (Fletcher, 2006) but what, then, does this mean for the other half?

Several studies looked at socio-cognitive factors that may impact learning differences for boys and girls. Specifically, Geraldine Rouxel (2000), a French researcher, looked at how anxiety and self-efficacy affected self-regulated learning behaviors. Fourth and 5th grade students taking French (first-language) or mathematics

exams reported how they felt about the tests before they took them and then these responses were compared to their performance. One key difference suggested that boys did not do as well as girls on the French exam and they reported that anxiety (both before the exam and after results from the exams were revealed) was an important determinant in their performance more often than the girls did. This could be due to perceptions about their abilities on language- oriented tasks (Pomerantz, Altermatt, & Saxon, 2002) or the differences in brain structure for boys and girls (Gurian & Stevens, 2005). Girls, on the other hand, felt that self-efficacy was more important than anxiety in determining performance on an exam (Rouxel, 2000). It is possible that such beliefs are rooted in parental control and girls' perceptions of their abilities based on how much autonomy they were given by their mothers. If they failed, girls took more responsibility for their failures than boys (Pomerantz & Ruble, 1998). Furthermore, girls

> may increase the effort they exert to do well… because they view their performance as informative about their abilities…Girls' view of evaluative feedback as diagnostic may also lead them to experience internal distress over their performance, especially when they fail. (Pomerantz et al., 2002, p. 397)

Another study (Jacobs et al., 2002) showed the longitudinal effects of perceived self-competence in three different domains (i.e. sports, math and language arts) from first-through twelfth grades. The results indicated that self-competence significantly dropped for both males and females in all domains over the years, but that females consistently had a higher self-competence perception in their language arts abilities than males, whereas males always had a higher self-concept perception of their math (and sports) abilities than females. Furthermore, both boys and girls had similar perception of their language arts abilities in first grade, but by grade six, the differences in their beliefs

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was statistically different. Math beliefs followed a different path: Boys started out having a higher self-concept of their math abilities in first grade than girls, but their rate of decline was much sharper than girls so by high school, perceptions about math abilities were about equal for both groups (Jacobs et al, 2002).

The role of a "task value" and pleasing adults may also make a difference in gender achievement differences. In the study looking at self-concept (Jacobs et al, 2002), task value over time was evaluated as well. It was hypothesized that males would consistently place more value on math and sports tasks, while females would typically value language arts tasks more than males over time. Yet females always placed higher value on language arts tasks than males and most of the time in math (unless boys had math "abilities") by the end of high school (Jacobs et al, 2002). This evidence could show one reason why boys may not do as well on language arts tasks throughout school and may decline on math scores by the time they reach high school. Boys may also not care as much about their grades or performance. The study by Pomerantz et al. (2002) suggests that, "Given that boys are not as likely to see their performance as reflecting on their abilities, they may not try their hardest" (p. 397). Girls, on the other hand, may feel differently since they "see their failure as indicating that they have disappointed adults" (Pomerantz, et al., 2002, p. 401). All of these factors may lead to some interesting results in this study.

Conclusion.

Service learning is a relatively new research field. Very few studies were conducted before 1980, and there are only a few that are considered highly respectable in the research community. This is not to say, however, that little information exists about

service learning. Many informational and speculative articles have been published, and some of these pieces serve as launching points for further study. Quality research that applies to middle school environments is rare, so more effort needs to be placed on backing up the perceptions about service learning with evidence of the role that it plays in middle schools. This is part of the rationale for this study.

Chapter 2: Method

Introduction

  This was a mixed methodology case study and a pragmatic approach to this analysis was used, where the quantitative data (from surveys) revealed some of the initial information and then qualitative elements from the surveys, journals and observations were added to offer a deeper insight as to how students felt about the experience. Each research question was explored independently, except for the one addressing gender differences. Because so many different analyses were done, it seemed logical to include the gender results at the same time to avoid confusion and undue repetition throughout the study.

  In order to effectively present the case and the instructional environment, a lengthy explanation about how the service learning project was introduced and presented included in this section. It was thought that giving this very descriptive overview of the way the project was developed and intended to be delivered would help make the results of the project more understandable to the reader.

Purpose of Study

  The purpose of this study was to describe a middle school service learning project and its influence on student learning and empowerment. Surveys, observations (formal and in field notes), journal analysis and document review were evaluated in a bounded case study, using a mixed methodology design. This design was chosen because the

research site is specific, the researcher has a connection to the site, the sample is small and the study is based on the outcomes of one service learning project.

This project fits Bill Gillham's set of criteria for case study because this situation is an activity needing to be understood in context, at the present time (2000). Robert Yin describes it as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context especially when the boundaries between the phenomenon and context are not clearly evident" (Yin, 2009; p. 18). He created a diagram that states the nature of the "linear but iterative process" and it fits this context well (Figure 1). Furthermore, in this situation, the case is "bounded," since there is a beginning and an end to the study, and it occurred in a "naturalistic setting" where the "process" and "underlying" explanations to the data were important, (Gillham, 2000; Stake, 1985).
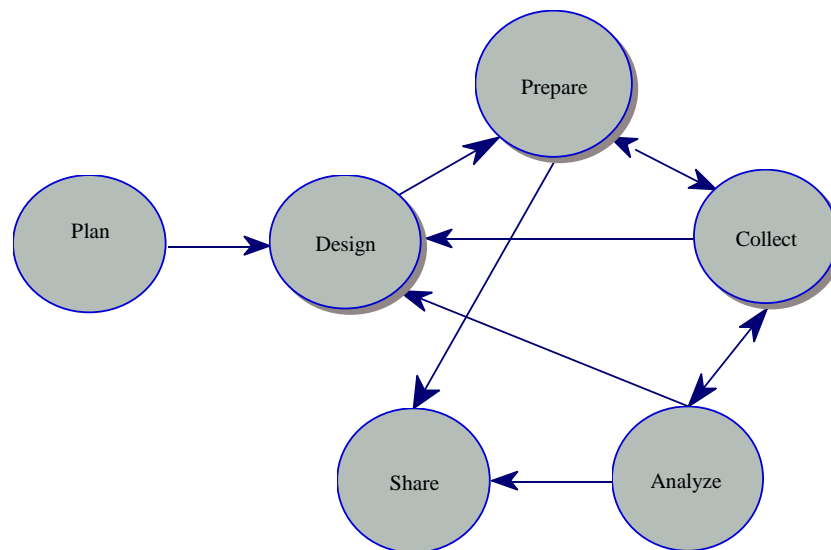
Figure 1: Yin's Case Study Diagram

Some of the initial findings (i.e. survey results) are reported through descriptive statistics and analyzed using t-tests. These results then served as a means for looking deeper at the data to see if there were any patterns that emerged about student understanding of academic concepts, general impressions of the project and gender differences. Secondly, the information from the surveys was compared to the reflective writing in the project journals and the different kinds of observations (as a participant observer) that took place throughout the course of the project.

Techniques borrowed from an action research process were used to shape the design. These fit well with this project due to the nature of the phenomenon that was studied, the researcher's role in developing the service learning project and the intent to learn from the outcomes and make necessary changes to the design of the program in the future. The origins of this kind of research date back to the mid 1930s. Kurt Lewin, a German, Gestaltian social scientist, created the term in 1934 after discovering that the approach addressed aspects of collective and practical research done by "ordinary people" that emphasizing reflection, discussion and future decision making (Mills, 2011; O'Brien, 2001). John Dewey and Stephen Corey, a professor from the Teachers College at Columbia University, are credited with the application of this research strategy in an educational context. They accentuated the need for educational leaders to apply action research to community problem solving so that systematic data collection and analysis could be applied to practical problem solving (Mills, 2011; Ferrance, 2000). In the mid-1950's, this kind of research dwindled as emphasis was placed on more controlled and empirical research practices (McKernan, 1996; Ferrance, 2000). In essence, a divide

between stringent research practices and the less controllable nature of real-world issues came into question. By the early 1970s, the practical nature of this research started to take hold once again when the value of a teacher as a researcher and the idea that educational problems may not always be best resolved by traditional, empirical research practices became more apparent (Ferrance, 2000). Lawrence Stenhouse was instrumental in this resurgence after he added a chapter to his book, *Introduction to Curriculum Research and Development* about the role of a teacher as a researcher in 1975 (McKernan, 1996). Since that time, this kind of research has made a full comeback and is generally accepted as a valued form of research in the educational arena where the purpose of the research is to problem solve and apply results to effective educational reform. This is the reason that the methodology was chosen for this study.

Research Questions

The questions being studied are:

1. Did students learn about hunger awareness and fractions from this service learning project?

2. How do students feel about their service learning experience?

3. What were students' feelings about the project and whether they can make a difference in their community?

4. Are there differences in how male and female middle school students perceived and participated in the service learning project?

Study Population

        Peak Middle School, the setting of this research project and an alias, is a mid-size public school serving students in 5th-8th grades in an affluent Colorado mountain community. The researcher is on faculty at this school, providing the access and opportunity to create and implement the curriculum project with colleagues, which is the subject of this study. The student body is drawn from mostly in-district students who live in a town well known for its skiing and service amenities. However, a fairly large portion of students also commute from neighboring communities. The current school population of approximately 447 students and 40 full-time staff members occupy a brand new LEED (Leadership in Energy and Environmental Design) certified building with enormous plate glass windows that frame the vibrant mountain scenery. Nearly 13% of the student body is on a free or reduced lunch program and this percentage is fairly equally distributed amongst the grade levels. Yet the 5th grade group used in this study has a slightly higher average of 15% of the students out of 118 students receiving free or reduced lunches. Even with a souring national economy, local tax payers are very generous to the school district (made up of one elementary, one middle and one high school all with equal number of students) and have recently passed a large mill levy to subsidize teacher housing and update the technology and bus fleet that that serves all three schools and the district pre-school.

        This middle school was chosen for the study for several reasons. Since the culture and climate within the school allows for a service learning project of this nature, it seemed like an appropriate choice and no other schools were considered. Service learning

has been a fairly large part of the culture for some time, but it is only in recent years that it is starting to become engrained in most facets of the school and it is usually reserved for students from the upper grades. Some teachers do small classroom projects while others choose to make it a focus of an entire year. Several teachers use a service-learning philosophy in their day-to-day teaching while others do it without knowing it. The merits of such learning are continuously made clear to faculty members, through the administration and school culture, and the school even received a Service Learning award in 2002 from the Colorado Department of Education recognizing the numerous projects that had occurred over the years. One positive change is that service is now the main focus of the multi-age advisory program during the fourth quarter of each school year. After spring break, each small group (approximately 12-15 students) of 5th-8th graders and their faculty advisor agree on a project to do during a school-wide service day each May. When this part of the program was implemented four years ago, the emphasis was on service learning, but time constraints and lack of professional development about how to combine service and "learning" together has kept many groups from making their plans into true service learning projects. These kinds of issues also keep service learning from entering many classrooms: the teachers who know how to do them and have always done them continue to do so while others still do not. Yet even though service learning is not a basis of the curriculum at the middle school being studied, it has enough deeply rooted history to make a study like this one both feasible and worthwhile, especially for most of the fifth graders who are being formally introduced to the concept for the first time.

Other reasons why this particular school was chosen is due to access and timing. Because the chosen middle school was not bound to any set curriculum delivery schedule and the pressure to prepare for high-stakes testing was over, the opportunity to do an integrated project presented itself. Teachers were free to try new strategies to generate student interest while meeting curriculum standards. Fifth graders spent the entire school year focusing on concrete math skills so creating a project that helped students see how these math skills could be applied to real life seemed like an effective way to help reinforce the learning. Secondly, surrounding communities were currently experiencing serious economic hardship and a new food pantry was opening in response to the growing need for food distribution. Pairing math with hunger awareness, in a way that could help the community, seemed like a worthwhile project to undertake and study.

Participants.

The participants for this project included all but one of the self-contained 5th grade classrooms (the researcher's students) at the middle school, approximately eighty students in total. While it is unusual to have an elementary grade level within a middle school, this structure has been in place for nearly forty years and 5th graders are treated just like any other middle school student. They rotate to daily "explorations," are exposed to half year classes in both French and Spanish and are participants in a multi-age advisory program where they meet with other 5th, 6th, 7th and 8th grade students three times per week for 25 minute sessions. Self contained classrooms for all major academic subjects (math, language arts, reading, science and social studies) is the only way that 5th graders are still treated as elementary school students.

Case

      As with all other public schools in Colorado, state mandated testing is an annual

event. Yet, historically high achievement on these tests has given the schools within the

district relative autonomy to deliver curriculum as they see fit in accordance with state

standards. Math has been a part of the district's improvement plan for the past year and

the elementary grades (kindergarten through 5th grade) recently re-adopted a well known

math curriculum that is reputed for its problem solving emphasis. It is from this

curriculum that the consumer math part of the service learning project was developed.

After looking closely at types of problems 5th grade students struggled with in the math

curriculum, parts of Colorado Math Standard 1 that emphasized the "use of number

relationships in problem solving situations" and Standard 6 that focused on "linking

concepts and procedures as they develop and using computational techniques…in

problem solving situations" were chosen (CSAP Frameworks and Blueprints:

Mathematics Grade 5, 2006). In particular, emphasis was placed on higher order skills

that required students to estimate, compare and recognize equivalent numbers through the

use of decimals, fractions and percents since results from the school's *Scantron* testing

revealed that no more than one-fourth of the students showed proficiency on any of the

seven items that tested this understanding. Another area of weakness was students' "use

of data collection and analysis…in problem solving situations," which is part of Standard

3. On the *Scantron* tests and in results from the 2008 4th grade math Colorado Student

Assessment Program (CSAP), most students were able to identify information from

various graphs, but fewer than half (47%) were proficient on any of the items pertaining

to interpretation of data from different types of graphs (CSAP Mathematics Grades 3-10 Performance Levels, 2008).

The other aspect of the project, pertaining to hunger, was developed after looking at the Colorado Model Content Standards for History pertaining to the explanation of patterns and identification of themes in history over time (2009) along with a growing community need (Dewsbury-White, 2009). Articles in local newspapers describe the unprecedented number of families needing help with food due to recent lay-offs in the construction and service sectors of the community. While the winter holidays are typically the hardest time for needy families throughout the country, the end of the ski season is often even harder for this area, so the food drive and grocery store purchases were planned for this time. Furthermore, the end of the state testing period had eased some of the academic pressure so teachers were more willing to involve their students in an integrated unit like the one planned in an effort to reinforce previously learned skills and units of study. This project seemed like a creative way to integrate math skills with a growing social concern.

All five fifth grade teachers at the Middle School voluntarily chose to participate in this project in their self-contained classrooms and the project had the principal's support as well. During spring, when motivation to learn is waning and ways to make academic topics more creative are helpful in keeping student attention, service learning projects are sometimes planned. In this case, it was thought that many of the mathematical concepts that were taught over the course of the year could be reinforced in a practical way so that students truly understood the connection between the skills they

have learned and their application to real-life problem solving. Furthermore, the choice to mesh fractional concepts with lessons about hunger and poverty were appropriately timed: The County's health and human services department was on the verge of starting a food pantry in the town based on a growing need for city residents. The closest food pantry was approximately thirty miles away so many needy people had no way of accessing food without making a long trip to the other side of the valley. Fortunately there is a willing group of faculty members who want to do a meaningful service learning project.

This project was based, in part, on a study conducted fifteen years ago by Kathy Dewsbury-White. In that study, it was determined that students increased their understanding of hunger issues, although these gains were not dramatic in any of the three grades (6th, 7th and 8th) that were surveyed. The understanding of math concepts was not a part of the previous study, but Dewsbury-White did find that students who volunteered their time beyond the required classroom activities had fewer questions about the nature of hunger than those students who only participated in classroom exercises. It was concluded that visits to the local food pantry led to a deeper understanding of how hunger impacts people (1993). Gender differences were also tested in Dewsbury-White's work but no significant correlations were found.

Consent and Assent.

Even though all fifth grade students were required to participate in the hunger/consumer math unit to meet the requirements of their math and social studies courses, the students voluntarily participated in this study. All students and their parents

were informed of the purpose of this research and asked to sign assent and consent forms, respectively, in order to participate in the study. There were 118 students in the 5th grade, Yet since my own class of 19 students was not included in the study and fifteen students, or their parents (three students opted out even if their parents did not), chose not to participate, there were 84 students who were in the study. Signing the forms was not mandatory so any students who did not turn in the forms were not included in the study or penalized for lack of participation. To assure confidentiality, a third party teacher, who was the school's gifted and talented coordinator and who had minimal contact the fifth graders being studied, was asked to collect all of the permission forms for the study and assign numbers to the students so that no names were revealed throughout the study to any of the fifth grade teachers or me. Furthermore, as was stated above, my own group of students was not included in the study in order to minimize expectation bias in the study. Some students opted out of this study, but I think that the face-to-face introduction of the project, along with a chance to ask questions, helped students feel less threatened by the nature of the project and thus encouraged them to participate. Furthermore, the newsletter inserts and detailed letters to parents about the project may have helped the subjects and their parents better understand the goals of the study.

Students who chose to become more involved in the service activities outside of the requisite classes had an opportunity to participate in a service visit to the new food pantry and/or become a member of the "Service Committee." This committee was a group of students who chose to volunteer their time during lunches and "team times" (two 30-minute blocks of class time per week where homeroom groups meet to discuss

grade level issues) prior to the start of the actual hunger/consumer math lessons. The students spent their time coming up with ways to get more involved with the issue at hand, which meant trying to involve the whole school in a food drive, raising awareness of hunger issues through school public service announcements, fliers and editorial letters in the local newspapers or creating posters for grocery store shoppers. Since authentic service learning involves student brainstorming and self-motivated tasks based on a perceived need, the Service Committee members chose how to expend their time and energy with the help of the 8th grade language arts teacher who served as a faculty advisor. All students who participated in the study took surveys at the beginning and end of the project and some chose to submit their project journals for use in the study as well.

It is important to note the level of experience 5th grade students had in service learning prior to doing this project. Even though service activities are fairly common at all grade levels within the local schools, very little time is spent on service *learning*. Students may have participated in isolated service projects in elementary school (i.e. food drives, fundraisers), but any significant time spent on the application of academic skills or explicit reflection on a project was unlikely. Earlier in the year, two out of the five fifth grade classes did participate in another hunger awareness project that introduced students to the connection between world and local hunger issues in a lecture format and culminated with the creation of clay bowls for a major local fundraiser. However, the emphasis of this project was on art rather than math.

Procedure

  This project lasted for nearly an entire calendar month (eighteen school days), but only seven, 1-hour math blocks were set aside to cover hunger/consumer math lessons in each of the five classrooms. The remaining time was dedicated to the activities that students volunteered to do such as participate on the Service Committee. Teachers chose the daily math period as the best time to teach the lessons based on the heavy mathematical emphasis and schedule consistency. A major focal point for the project was the interpretation of statistical data highlighting facts pertaining to hunger and poverty and this provided the perfect link to the study of graphs and fractional numbers in math class. Furthermore, students learned about common marketing practices used to lure consumers into making purchases and how unit prices are used to help consumers make choices about food that is sold at grocery stores.

  Before the project began, parents were sent letters of explanation about the project and consent letters to sign. On these letters, parents had the chance to opt out of the study or choose to let their students participate in selective parts of the project (i.e. journal submissions and/or photos). Secondly, students had the project explained to them in class and they, too, had a chance to opt out of the study if they chose by signing an assent form.

  After the consent and assent materials were returned to each student's classroom teacher, each student was assigned a number and asked to take an online survey (pre-survey) before they started any required or voluntary project activities. All students were then introduced to the project and to the volunteer opportunities available to them. For

the entire duration of the project, students who chose to volunteer for the Service Committee came together for 30-60 minute blocks of time, each school day (lunch time) and met with an 8th grade teacher who agreed to act as a project facilitator. Service Committee members discussed ways to involve the entire school and then carried out their plans with the guidance and support of the 8th grade language teacher. Ideas included posters, public service announcements, letters to the editor of the local newspapers, and visual displays that encouraged all students to donate food or money in a school-wide food drive.

At the start of the second week, content lessons were introduced during individual math classes to all 5th grade students. During these seven, daily, one- hour lessons, students learned about world hunger, local hunger and consumer math through the use of graphs, statistics and fractional numbers in introductory lessons and interactive follow-up activities. A reflective writing assignment and practice problems relating to the math concepts taught during the lessons were given for homework each night and grades were only given based on the level of participation (a three-point scale) in the project and on homework assignments. No formal assessment was given.

On one of the last days of the project, all students were encouraged to bring in at least $5 to show support for the cause. All of this money was collectively added to any other funds the Service Committee raised and then it was divided up and distributed evenly to small student groups who used it to make food purchases at a local grocery store. Students were placed in groups of three or four and asked to spend the $20 they were given to purchase as much of the food on the list as they could using their

knowledge of unit pricing to guide their purchases. All of this food was then given to the local food pantry.

Any student who then chose to participate, regardless of whether they were a part of the Service Committee or not, was supposed to have the opportunity to visit a local food pantry after the food was purchased. During this visit, I had hoped students would learn about the storing and distribution process first hand and this visit was planned during school hours so that transportation and extracurricular activities would not interfere with the opportunity to participate. However, the food pantry did not open in time so students were unable to visit it within the timeframe of this study.

At the end of the project timeline, all students were asked to take another assessment (post-survey) and spend some class time answering the last set of questions in the project journal. After these tasks were completed, all journals were given to a non-fifth grade teacher who then pulled out journals that were not permitted to be a part of the study. This teacher then put an alpha-numeric code on them to correspond to a student number and gender. These coded journals were then submitted to me for analysis.

Instructional Context and Project Layout

Beyond the basic description of the curriculum needs and overall project design, a further description of how this service learning experience was introduced and implemented is warranted. The primary goal of the project was to integrate math skills that were taught earlier in the school year into a meaningful project that helped build an awareness of a community need. Therefore, there was an emphasis on learning about the problem and how to apply certain math skills before any service was done. A secondary

goal of the project was to help students understand that they do not need to look far for meaningful service activities and that they can do very simple things that can make a big difference. As was noted earlier, the school district has a strong culture of service, but many projects occur outside of the local area and require considerable preparation in the form of logistical planning, out-of-school learning (e.g. mentorships) and fundraising. I wanted students to see that service learning can be localized and can occur with few resources. This was to be done through a detailed set of lesson plans (Appendix B) and slideshows.

Introduction.

About two weeks before the official start of the service learning project, students were gathered together the 5th grade core area and were told about the project and how they could choose to be a part of a research study. By this time, all consent forms (Appendix C) from parents were returned, but students also needed to be given the opportunity to formally opt into the research as well by signing an assent form (Appendix D). They were told that participating in the research was voluntary but that participating in the project was not, even though the only grades they would received for their participation were based on their completion of the project journal.

In addition, students were told about an opportunity to participate on a voluntary committee with an 8th grade teacher acting as a facilitator. This group would start meeting on Monday of the following week during lunch periods. The committee's goal was to give students a chance to do extra service activities that tied into the forthcoming project. At the end of the presentation, a teacher read the assent form with the students, asked if

there were any questions and then had students decide (by checking off their choice and signing their names) if they wanted to be a part of the research or not.

The next day, all students were taken into a computer lab and asked to take the online pre-survey (Appendix G).

Day 1.

This was the first official day of the lessons and students were presented a project calendar (Appendix I) and an introductory slideshow projected onto an interactive whiteboard in their own classrooms. This presentation outlined the goals and students' role in the project and then asked them, in pairs, to read through several short articles that covered a range of closely related topics. One article discussed the problem of world hunger, another featured how students in Minnesota addressed a hunger need in their community, a third showed how a creative idea of saving leftovers could solve a problem and then the last focused on the town's need for a food pantry to help address the growing hunger issues in the valley. All articles had the common theme of showing how young people like themselves could make a difference in their community.

After each pair was through reading their own article, the students were placed with other students who read articles different than their own. Each student was asked to share what he/she learned from the article that was read so that ultimately all of the students were exposed to all of the articles and had answered some basic questions that synthesized all of the information. After this discussion, students were introduced to their project journals (Appendix J) and asked to work in their small group to answer the

questions on "Day 1." This initial prompt encouraged students to brainstorm ideas of how they could help others in various contexts.

Day 2.

Students were presented another slideshow that focused on the issue of world hunger. By being introduced to the concept of 1 billion and vocabulary words that are commonly used to describe various aspects of hunger (i.e. starvation, malnutrition, food insecurity, poverty), students learned about the difference between first, second and third world countries. To emphasize the difference between their own lives and those of those in a third world country, students listened to a brief story entitled "A Day in the Life of a Third World Teenager" taken from the "World Food Day Curriculum" for grades 4-7 (Hursh & Simmons, 1986). From this story, there was a short discussion about how the teenager in the story spent most of his day working to help the family rather than being able to get an education. Students were then asked to take a card with a country written on it, group themselves together according to the number on the back and then locate the country on each card on a world map (either in a student atlas or on laminated map). Some countries were obvious and required little effort to find while others took considerably more time and effort so students were encouraged to help each other. As a full class, students then discussed the locations of their country groups and were directed to think about the general location of third world countries (around the equator) and what this meant for access to resources.

The next part of the class discussion turned towards the relationship between poverty and hunger and how much of the world is suffering from poverty. The

conversation was then directed toward poverty in the United States, followed by poverty in Colorado. Students were encouraged to understand the scope of poverty in Colorado versus the U.S. and the world on a pie graph and through the use of fractional numbers. After students had a chance to work with these ideas and practice some of the skills that were covered on the "Understanding Pie Graphs" section of their project journal, students were asked to go back to Day 2 in the journal and to reflect on their feelings about hunger.

Day 3.

As a continuation and extension of the previous day's lessons, students were encouraged to think about the reasons for hunger. Again, in their respective classrooms, they were presented a slideshow that emphasized some of the key points from the previous day (i.e. the relationship between access to resources and poverty). Students were also exposed to several line graphs that led to discussions about populations in different parts of the world and why certain place have more people than others. To push this thinking a little further, students were asked to consider caloric intake in different types of countries (taught through a kinesthetic activity) and think about why populations fluctuated in certain places over time. As a follow up to this discussion, students applied this thinking to several pages in their journal. They were asked to interpret data from two different graphs that were discussed in class and then reflect on the reasons for hunger.

Day 4.

This day was dedicated to bringing the hunger issue into a local context. A speaker from the regional food pantry came to speak to the entire 5th grade about hunger

in Colorado and, in particular, in the local valley. Students sat on the floor in the 5th grade core area and listened to the speaker talk about the differences between a food bank and a food pantry (one is a supplier for the other) and why the town was in need of its own food pantry. He described his experiences in feeding the hungry at a soup kitchen and how many meals his organization gave out each month. The speaker also emphasized the dramatic increase in the number of meals being served and the amount of food being distributed. He rounded out his presentation by telling the students the kinds of food that food pantries can accept and preferred. Students had about twenty minutes to ask questions and then get together in small groups (four or five students) to brainstorm ways to promote hunger awareness in the community.

Day 5.

The emphasis of the lesson shifted from hunger towards marketing and consumerism. Students started with a slideshow that had them thinking about their favorite TV shows and the kinds of advertising that they see when they are watching them. During this discussion, the class made a bar graph to represent everyone's favorite kind of programming. This activity not only served as a review of graphs and some of the associated vocabulary (i.e. median, mode, range), it also helped students think about the advertisements they see in grocery stores. Students learned how to comparison shop by understanding various marketing techniques (i.e. 2 for 1 or 10/$10.00) and then looking at unit prices on product labels. The second half of the class was spent practicing these skills as a class (examples were written on a white board) and then independently in the project journals. Students ended the class with reflection time for Day 5 (pertaining to

how students feel about brand names versus generic ones) and some instruction about how to create an advertisement for extra credit homework.

Day 6 and day 7.

Due to the lack of computer lab space for all of the participating classes, some classes continued to learn about unit prices and then practice their skills on a website while other classes learned about calculating taxes and then played a game that reinforced this skill. Both of these learning activities were introduced through a slideshow.

Classes that continued practicing unit prices spent some time learning about budgets and how to use a calculator to figure out a unit price if a product label does not have this information. This was a necessary skill for the group of students who made purchases for the food pantry at a grocery store that did not have unit prices products. They also learned about how a product cost changes over time (review of growth patterns). After the students had practiced these skills in the classroom with guidance, they went to a computer lab and independently practiced calculating unit prices at a given website. At the end of the class period, students had an opportunity to reflect on purchasing choices and coupon use. At this point, teachers were asked to create a sub-group of their students who understood unit prices well enough to do their grocery purchases at the store that did not have unit process on the labels.

The other classes, who were not working on unit prices, learned about taxes. They started by reviewing what a tax was and then learned how to mentally compute 10% of a number. This number was chosen since this is a fairly close approximation of sales tax (the town's taxes are currently 9%), it is an easy number to use for mental calculations

and it helped students think about the money they needed to reserve for taxes when they went to the grocery store. Once they had practiced this concept as a class several times, teachers passed out a set of "Tax Concentration" game cards to each pair of students. The object of the game was to match up a certain denomination of money with its 10% equivalent (i.e. the answer to "find 10% of $42.00" was "$4.20"). If students quickly mastered this concept, they were given a chance to challenge themselves with a variation of the game that emphasized 5% and 20% of a number. At the end of the class period, students were asked to complete a worksheet in their project journal that reinforced how to find 10% of a number.

If classes did one set of activities one day (Day 6 for example), they then did the other set of activities the next day.

Day 8.

All classes spent this last class period reviewing the mathematical concepts that they had learned over the past several days and then prepared for the grocery store visit the following day. Important review topics included paying attention to advertising, finding unit prices and calculating taxes. Teachers then provided each student with a "Grocery Store Challenge" worksheet (Appendix K) and instructed students about how it would be used the next day. Students had a chance to practice some more calculations and were encouraged to use the examples on the back of the sheet to remind them how to do the necessary math work. At the end of the class, teachers told students who their group partners would be (most groups had four students in them) and in which store they would make their purchases (the ones with unit prices on the labels or the ones with

nothing more than a product price). Students were reminded that the purpose of the grocery store activity was to practice math skills while purchasing as much food as possible for the food pantry (scheduled to open in as the project wrapped up) turning it into so there would be a friendly competition for students to see who could purchase the most food with the $20 they were given.

Grocery store.

The culminating activity was a trip to the local grocery store to make purchases for the food pantry. Student groups were given one worksheet, a calculator, a clip board and $20. They were told that they had 45 minutes to make their purchases and they could needed to buy at least one item on their list and not any other kind of item. A dedicated cashier checked out each student group and several teachers stood nearby in case students did not have enough for their purchases. All food was then loaded into a truck and taken back to school so that it could be categorized and then given to the food pantry.

Supplemental service activities.

All Students had an opportunity to participate on a voluntary service committee that was advised by an 8th grade teacher. This group had few goals other than trying to creatively help make the rest of the school and possibly the rest of the community aware of the hunger issue in the valley and the subsequent service work that the 5th grade was doing for the food pantry. They were told that they could use whatever ideas they could develop, but they had to use only the resources readily available through the school- there were no extra funds to assist with this part of the project. The group initially met during

the lunch period at the beginning of the project and then created other meeting times for the next several weeks.

Data Collection

In order to provide richness to the study and triangulate the findings, different types of data were collected and used. These included surveys, observations, field notes and project journals

Surveys.

Along with some fractional math items that I developed, I used an instrument initially designed by Dr. Dewsbury-White (1993) and it was designed to measure:

- The total knowledge or subject matter score on the social issue of hunger and understanding of fractions (pre- and post-survey)

- A total experience score was based on the words the students chose to describe their overall service learning experience (post-survey)

To address questions for the third research question, I also used questions from a CDE service learning survey given to all students in schools who were "Learn and Serve" grantees in 2002. These questions were designed to measure:

- A total empowerment score based on answers to the questions students were asked about helping to solve problems and making a difference in their community (pre- and post-survey)

Through the use of frequency tables, only the total mean scores of the surveys were analyzed. Different sub groups such as gender, low social and economic status (determined through participation in the free or reduced lunch program) and students who performed poorly on the questions pertaining to academic constructs were also

considered since these are the students whose achievement is typically monitored very closely.

The pre-survey had forty-four items on it and the post-survey had fifty-four. Twenty-six of the questions pertained to the information about the hunger issues and fractional math concepts being taught through the service learning project. Since a similar hunger awareness curriculum was being used to teach these ideas that were used in Dr. Dewsbury-White's research fifteen years ago, only the answers to the questions were updated. An exhaustive search for more current lesson planning materials led to nothing that was more current for a 5th grade student. Therefore, it was decided that even though the exact figures and terminology were not up-to-date, the conceptual ideas were the same. Specifically, "First," "Second," and "Third world" are not used often in current references to various types of countries in the world, but they are still used interchangeably with "developed" and "developing" countries in internet searches because specific terminology is still debated (Karpilo, 2010). Furthermore, references to First, Second and Third world countries was a focus of the curriculum that was used and was intentionally left as it was planned to minimize confusion for teachers and students during classroom activities.

There was an additional set of questions relating to consumer math since this was not a research consideration in the previous study. These questions were strategically written using survey research procedures (Dillman, 2000; Katz & Green, 2004) and were in direct reference to the subject matter being taught in the consumer math lessons. While

there were both marketing and math oriented questions on the survey, only the questions

pertaining to the understanding of fractional numbers were analyzed in this study.

Journals.

Including students' journals in the data collection was a way to give deeper

insight and to assist in the interpretation of results gathered from the surveys. The

important aspects that make service learning powerful for students is the time they are

given to reflect on their activities and what they have learned from them. Since students

had daily opportunities to write about what they learned and how they felt through the

use of prompts, the data coming from the journals was triangulated with the data obtained

from surveys observations and field notes.

Each day, students had class time to respond to a prompt in their journals based

on the lessons that were taught in class. Students were expected to answer the prompt in

any way that they wanted. Few instructions were given and only a three point

participation grade was awarded (no points were deducted for spelling for spelling or

punctuation errors). Three points were given if prompt was answered thoroughly, two

points if an answer to a prompt was nearly complete (a piece of information is missing)

and one point if an attempt to answer was made but was not at all relevant to the prompt.

The questions posed to the students on "Day 7" in the journal were derived from

the interview questions Dr. Dewsbury-White used in her research. While several

questions were added to the list of journal topics used in this study, the questions

analyzed for this research were piloted on parents of middle school students in the

previous study in order to make sure that the language and syntax was developmentally

appropriate (Dewsbury-White, 1993). These questions were the final questions in the journal and students answered them after the post survey.

All journals were anonymous using a number coding system. Students had their names on their journals until they completed all of their writing assignments. After responding to the daily prompt, students turned in their journals to their classroom teacher so that the three-point participation grade could be given. At the very end of the project, all students turned in their journals in to the third-party teacher responsible for assigning an alpha-numeric code to the data. The journals that were allowed to be submitted (per confirmation on consent and assent forms) had white mailing labels placed on top of them. An alpha-numeric code was then written on each label to correspond to a student on a list and his/her gender. The study facilitator kept a list of all of the participating students (and their matching codes) and all of the journals not approved for use, thus minimizing any issues that might arise for students who chose to participate.

Observations.

Using the template in Appendix L (Gillham, 2000; Hancock & Algozzine, 2006), I observed participants in their math classes at the same time each day and during the one hour visit to one of two grocery stores. Students who were not included in the study were taught in separate classrooms and were in separate groups at the grocery stores. As the sole participant observer, I documented (in my field notes) visible behaviors, conversations, intonations, and other nuisances that occurred during the observation periods in hopes that the observable behaviors added supplementary meaning to other data (Gillham, 2000). In an effort to observe in at least three classes during each math

period, I spent fifteen minutes in classrooms and paid particular attention to attending

behaviors (i.e. eye contact, hand raising, distractions) and the kinds of questions that were

asked by individuals and the class as a whole, while also noting the gender differences.

"Time on task" was another consideration, and this was reported once every five minutes

for 30 seconds. I counted how many students were on task, which meant facing the

direction of the lesson and making eye contact with the person delivering the lesson. Off-

task behaviors were those that exhibited boredom, disinterest or distraction as defined by

a head on a desk or leaning back in a chair (if focus was not towards the lesson), looking

away from the lesson, doodling, playing with objects, talking and writing notes.

At the grocery store, the observations were more informal: Groups of students

were observed for as long as a relevant conversation occurred and careful attention was

paid to how students solved unit pricing problems and how they decided to purchase one

product over another. In addition, un-engaged behaviors (pushing cart without interacting

with group members, looking at items that were not on shopping list) were noted as well.

At the end of each observable session, I took several minutes to reflect on the experience

and wrote down any extra information that seemed relevant as "field notes." These

included responses to observations, extra contextual information (i.e. space issues in the

grocery store, availability of adults) that could impact the experience and obstacles in

learning (i.e. not having enough calculators, having enough space to do computations on

worksheet, having problem examples on backside of worksheet)

Over the course of the project, I jotted down field notes. These notes added

support for some of the observational data and served as a place to record how the action

plan needed to be tweaked in order for the outcomes to be attained. In the end, these notes reflected any of the observations that were extraneous or not part of the observation sessions mentioned above.

Validity and reliability.

Several strategies were used to address the validity and reliability of the current study. It seemed that triangulating the data through the collection of various forms of data would be one of the best ways to test construct validity (Yin, 2009; Sagor, 2000) so a triangulation matrix was created to reflect this process (Table 1). In this representation, each research question had at least three forms of data associated with it so that data could be cross referenced and validated by the other sources.

Furthermore, all of the questions used to measure hunger awareness, engagement (How did students feel about their service learning experience?) and empowerment (Do the students feel like they can make a difference in their community?) were tested on other populations and used in other studies before they were used in this one. The hunger awareness questions were used in Kathy Dewsbury-White's study (1993) and the other questions were used on a Statewide Colorado Department of Education (CDE) survey in 2004. Both sources, used with permission (Appendix E), state that validity and reliability tests were conducted to ensure that the questions measured what they were purported to measure. The ones adopted from Dr. Dewbury-White specifically addressed the subject matter of hunger, while the CDE questions pertained directly to civic engagement and the overall service learning experience (Dewsbury-White, 1993; Pinhas & Kim, 2005). I addressed the same issues in my study.

Table 1

Triangulation Matrix for 5th grade Service Learning Project

Question	Associated Terms	Data Source #1	Data Source #2	Data Source #3
Did students learn about hunger awareness and fractions from this service learning project?	Learning	Pre & Post Survey (comparisons-quant.)	Journal (Yes or No- quant.)	Observations (use rubric)
How do students describe their service learning experience?	Engagement Motivation	Post Survey (use rubric)	Journal (use rubric)	Observation and Field Notes (use rubric)
What were students' feelings about the project and whether they can make a difference in their community?	Empowerment Student Voice Efficacy	Pre and Post Survey (Yes or No- quant. comparisons)	Journal (use rubric)	Observations and Field Notes (use rubric)
Are there differences in how male and female middle school students perceived and participated in the service learning project?		Pre-Post Survey (compare results from survey)	Journal (compare scores on dichotomous items)	Observations and Field Notes (emergent themes)

The questions used to assess math knowledge on the survey were the only ones created for this study and were not officially tested on another population before being used in this study. However, having the 5th grade teachers and the gifted and talented teacher in charge of coding all of the participants serve as "expert reviewers" (Anderson & Kanuka, 2003) helped validate the questions written for the online surveys. Each teacher had the opportunity to look at the questions being asked on the surveys and give feedback about the connection between the wording and the context of the lessons.

While there were suggestions and subsequent changes made to the way that a few of the questions were phrased, the general consensus was that the constructs were valid for the content being taught.

Analysis of Data

The analysis of the data was done in several steps as outlined in Appendix M. First I looked at the results of the surveys and determined the scores for each of the quantitative categories: total knowledge, empowerment, and involvement. Then I differentiated results by gender to determine score differences between boys and girls, before looking at qualitative results from the other data sources (i.e. open-ended survey questions, journals and observations). Low performing students, low SES students and different levels were considered in all of these analyses as well.

Quantitative analysis.

A considerable amount of data from the surveys was analyzed using descriptive statistics and single sample t-tests. Mean scores and standard deviations from both the pre- and post-surveys (from journals that were allowed to be used) were compared in a frequency table, just as were used in Dr. Dewsbury-White's study (1993):

1. Total Knowledge score = the total number correct on 24 items on the pre- and post-surveys

2. Total experience = one dichotomous item on pre- and post-survey

3. Total empowerment = three dichotomous items on pre- and post-survey

The scores of all of these totals were then evaluated according to gender to see if there were any differences in the outcomes. The results from this part of the data were

used to examine changes in student understanding of math and hunger before and after the service learning project. Then single sample t-tests were performed on every comparison group that had a pre-survey and a post-survey mean to see if any of the changes from the beginning to the end of the project were significant.

Besides gender, several other sub groups were considered in the pre- and post-survey quantitative analysis. The first group was students who received half or less than half of the total knowledge points for each academic area on the pre-survey. These cuts were determined by a typical failing grade (normally half or less than half of the possible points on a typical school assignment) and this group of students was referred to as "low performing" throughout the rest of the study. The second group was students in the free or reduced lunch program and were called "low SES" for the remainder of the study.

One last analysis was conducted on the results from the hunger or fraction sections of the survey. Questions that were considered "analytical" (breaking information apart and requiring students to deduce their understanding of that information) rather than "knowledge," "comprehension" or "application" (recalling, putting statement in own words or using information to solve a problem) based according to Bloom's Taxonomy of the Cognitive Domain (Clark, 2004) were analyzed. Again, mean scores and standard deviations were calculated for each of these groups and then 1-sample T-tests were done to see if any of the gains that students made from the pre-survey to the post-survey were significant.

In the journals, several descriptive analyses (means and standard deviations) were calculated for the math work that students did in their project journals (Appendix J) at the

end of each lesson. The lessons all had a different emphasis and a total of ten problems

dedicated to understanding the use of fractions and percents in pie graphs

("Understanding Pie Graphs"), unit prices ("Unit Prices") and growth patterns and taxes

("Milk Costs" and "Taxes") was included in the journal. At the end of the project, correct

answers for each set of problems were tallied and means were compared, as an overall

group, to the average number of problems that students earned on the post-survey.

Questions in the journal were identical to the type of questions on the survey.

Qualitative analysis.

Surveys.

All participants took a pre-survey and post-survey. Four open-ended questions

were included in the post-survey as follow up answers to dichotomous questions (either

true/false or yes/no) immediately before them. The questions were then replicated in the

journals to establish data reliability. To analyze the answers to these questions, data for

each one was first categorized according to a positive or negative response (all questions

prompted for a yes or no to start out the answer) and then grouped according to themes

based on the occurrence of certain words in the response. These themes were then

distilled into other categories that best represented the nature of the answers (i.e. students

who wrote that they needed more money or more time at the grocery store may then fit

into "grocery store improvement" category), but all variations of that answer were

included in the analysis and results as well. A basic tally of occurrences (i.e. 11 out of 33

responses) and percentages was calculated and answers that did not fit into any larger

category or that had a distinct pattern of their own were noted in the results at the end of the reporting.

Journals.

Each participant also submitted a journal for analysis. Since some of the questions were exactly the same as the ones on the survey, the analyses were the same as were described above. The themes that emerged from the journals were then compared to the relevant quantitative results and then the information that came from the open-ended survey questions.

To objectively analyze the qualitative data, an analytic strategy developed by Richard Sagor (2004) was implemented. Several rubrics were created that represented the spectrum of ideas that were intended for each of the qualitatively oriented research questions (Appendix N). Each student's open-ended response was evaluated based on the rubric and assigned a number. In the end, these scores were averaged. Key quotes or statements were then included in the results to support the findings.

For the journal prompt analysis that was used to evaluate student's overall service learning experience, a separate template was used (Appendix N) to calculate how much students wrote. The inclusion of a fact (came specifically from the lesson; could be a number, vocabulary word, or idea) and the quality of the description (did it include a noun and was a specific example used?) was also considered. Each answer had a code associated with it and each student's response was analyzed so that patterns could be identified individually if necessary. The total number of students (and gender differences) was then reported for part of the analysis. A total number of occurrences for the three

categories were calculated as well. If students wrote even one word for a prompt, it was counted in the analysis since it appeared that students has the opportunity to respond to the prompt and maybe just chose not to do so. Students who did not write anything for a given prompt were given a "0" in all categories and these findings were included in the results as well.

Observations.

In an attempt to triangulate the data from the surveys and journals, observations were performed during classroom lessons and during the grocery store visits. Using Gillham's observation template (2006) in Appendix L, themes in the observation data surfaced. The same rubric used in the journal data interpretation was used for the observations as well so that the results would be as objective as possible. Furthermore, specific insights from field notes were drawn out and added to the findings from the rubric in an effort to reinforce the evidence.

Limitations.

The fact that I was a fifth grade teacher at the school that was studied is a limitation of this study. Data from my own students was withdrawn from the study and my familiarity with other students from the grade level was limited. However, I was recognizable to all of the students in the study. With this in mind, an elaborate numeric coding system was created by the school's gifted and talented coordinator. She was chosen because she is used to dealing with sensitive material and has little familiarity with most of the fifth grade students being studied. This teacher understood the nature of the study and the need for the coding the participants, but she had not read any material

relating to the study and she had no vested interest in the outcomes. Only this third-party person knew the true identity of the students.

Because the school was small and access to it for a study like this was not difficult, no other settings were considered. Furthermore, the school was not impacted by many of the "high stakes" curricular models that exist in other areas so getting buy in from teachers to implement the service learning curriculum did not require any extra pressure. Yet the advantages of this opportunity also presented some limitations. There were not enough students to create a comparison group, which is highly advised in service-learning research (Billig, 2000; Johnson & Notah, 1999). This means that an attempt to formally generalize the findings to other middle school settings was not possible or appropriate.

School culture, which was discussed earlier is another limitation. Even though 5th grade students were not formally introduced to service learning before this project began, it is a very strong part of the school culture and the idea of contributing to a community is not unusual for students in this building. Students in this study had most likely participated in service projects in elementary school where they might have collected food for food drives, made bowls for the "Empty Bowls" project (another hunger awareness project) or sold baked goods to raise money for a charity of choice, but focusing on the learning components of service learning and encouraging reflection along the way was most likely new to almost every student who participated in the study. This is the reason that the learning outcomes were such a strong focus of the current study.

Chapter Three: Results

The purpose of this study was to describe a middle school service learning project and its influence on student learning and empowerment. The results are presented below under each research question, but the findings from the fourth question pertaining to gender differences are mostly embedded in each section and just a brief summary of findings is included at the end. I presented the quantitative survey results first in two sections: hunger and fractions. This was done so that findings from each area could be interpreted individually before other data pieces (i.e. journals and observations) were introduced since other findings were not topic specific in most cases.

Research Question 1:

Surveys.

Student learning about hunger.

Part of the first research question was: What did students learn about hunger awareness from this service learning project? As seen in Table 2, the t-tests from the survey showed that all students demonstrated significant gains from the pre-survey to the post survey in their understanding of hunger concepts. In addition, the gains for females were significant. On the other hand, the change between pre- and post- mean scores for males on this part of the survey was not significant.

Table 2

Total knowledge results from hunger questions on survey

Independent Variable		N	M	SD	t-score	*P* value
Total	Pre-	84	9.12	2.02	t(157)= 3.56	≤.05*
	Post-	75	10.31	2.19		
Male	Pre-	40	9.13	2.15	t(73)= 1.58	.12
	Post-	35	9.89	2.00		
Female	Pre-	44	9.25	1.66	t(82= 4.34	<.001*
	Post-	40	10.92	1.87		

*p<.05

Another analysis of the survey data was done to look at growth for low performing students on the hunger section of the survey (Table 3). Of this group (N = 30), 73% or 22 of the participants made gains on the post-survey and fourteen of them improved their scores by three or more points. Four of the students who made such substantial gains were boys and ten were girls. All of these results were significant.

Table 3

Analyses of total knowledge scores for students who earned half or less than half of total possible points on hunger survey

Dependent Variable	Independent Variable				t-score	*P* value
	M	SD	M	SD		
	Pre-		Post-			
Total N = 30	3.88	1.02	6.10	1.96	t(78)= 6.35	<.001*
Male N = 16	3.78	1.16	5.67	2.22	t(34) = 3.20	<.01*
Female N = 14	3.95	.90	6.45	1.69	t(42) = 6.42	<.001*

*p<.05

Another analysis was conducted on low SES students. There were only six participants who fit into this category, and as a total group they made a modest mean gain of 1.17 (SD = 1.17) points on the hunger section of the test, which was not significant,

(t(10) = 1.34; p = .21). Only one of the students in this group was a girl and her score

actually went down one point from the pre- to post-survey.

In yet another pre- and post-survey analysis, questions pertaining to hunger and

fractions were categorized on the survey according to Bloom's Taxonomy (Clark, 2004).

Questions that were analytical in nature were separated out from those that were lower on

the scale and pertained to knowledge, comprehension and/or application (Appendix O)

and the exact same questions were used on the pre-survey and the post-survey. This kind

of analysis was chosen to see if there would be a difference in results based on the types

of questions students were expected to answer. Questions that require higher order

thinking would demonstrate a different level of learning and understanding than those

that fall lower on the taxonomy, so seeing if there were performance differences based on

the level of type of question being asked could give evidence about students overall

understanding of the concepts. For the hunger section, the results (Table 4) show that

significant gains were made for the total group of students and for females no matter

what kind of information was tested. Yet, there were no significant gains for boys in

either category.

Table 4

Hunger knowledge/application questions vs. analysis questions

Dependent Variables		Independent Variables							
		Analysis				Knowledge/Comprehension/Application			
		Pre-	Post-	t-score	P value	Pre-	Post-	t-score	P value
Total	N	84	75	t(157)= 2.64	<.01	84	75	t(157)= 3.19	<.01*
	Mean	4.35	4.88			4.77	5.45		
	SD	1.30	1.22			1.32	1.37		
Males	N	40	35	t(73)= .99	.33	40	35	t(73)= 1.40	.16
	Mean	4.40	4.69			4.75	5.20		
	SD	1.30	1.23			1.54	1.18		
Females	N	44	40	t(82)= 3.09	<.01	44	40	t(82)= 3.48	<.01*
	Mean	4.36	5.15			4.89	5.79		
	SD	1.26	1.06			1.02	1.34		

*p<.05

There were specific questions where students made the most improvement and these are listed here:

- "Food insecurity means worrying about starvation" (comprehension level true/false question where an average of ten students made gains; equally distributed amongst boys and girls)

- "One out of every ____ people live in poverty in the United States" (knowledge level multiple choice question where an average of thirteen students made gains; just a few more girls than boys)

- "A 'developing' or 'Third World' country means that the country is poor" (analysis level true/false question where an average of thirty-four students made gains; nearly double the number of girls than boys)

- "It is possible for a person with a full-time job to not have enough food to eat (analysis level true/false question where an average of eleven students made gains; just a few more girls than boys).

Student gains for the "developing country" question were the most considerable in this analysis. As will be seen later, this became a strong theme in the qualitative results section as well.

On this part of the survey, there was a dichotomous question that was oriented towards students' perceptions of their learning. One question asked, " Did this project help you understand hunger issues better than you knew them before?" Sixty-nine out of seventy four participants gave positive responses (93%) and this number was almost equally distributed between boys (33) and girls (36). This finding is consistent with the significant gains that students made in their understanding of hunger concepts.

Student learning about fractions.

The next part of the first question was: What did students learn about fractions awareness from this service learning project? Similar to the hunger results, the total group and females made significant gains, but the males did not (Table 5).

Table 5

Total knowledge results from fraction questions on survey

Independent Variable		N	M	SD	t-score	*P* value
Total	Pre-	84	5.03	1.71		
	Post-	75	6.25	1.95	t(157)= 4.20	<.001*
Male	Pre-	40	5.35	1.83		
	Post-	35	6.06	2.07	t(73)= 1.58	.12
Female	Pre-	44	4.80	1.53		
	Post-	40	6.54	1.76	t(82= 4.34	<.001*

*p<.05

In an effort to see how students performed on the survey in relation to other math work that they did, practice work that students did in their project journals (Table 6) was evaluated. Each assignment was worth ten points, just as there were ten questions about

fractions on the survey. The students performed, on average, two points better on the journal assignments than they did on the survey.

Table 6

Means for fraction work in journals compared to same kinds of questions on survey

	Journals			Surveys		
	Concept	M	SD	Concept	M	SD
Total	All	8.67	.68	All	6.25	1.95
	Pie Graphs	8.97	.04			
	Unit Prices	7.35	.50			
	Milk & Taxes	9.00	.00			
Male	All	8.74	.73	All	6.06	2.07
	Pie Graphs	9.00	1.63			
	Unit Prices	7.00	2.20			
	Milk & Taxes	9.00	2.47			
Female	All	8.59	.77	All	6.54	1.76
	Pie Graphs	8.95	1.35			
	Unit Prices	7.71	2.14			
	Milk & Taxes	9.00	1.31			

In the journals, students performed the best on the milk and taxes section (see "Milk Costs and Taxes" in Appendix J) with an average of 9 out of 10 questions correct (SD = 0) and the score was the same for boys and girls. All students did nearly as well on the percent practice (see "Understanding Pie Graphs" in Appendix J) with a total average of 8.97 problems out of 10 correct. Students did not do as well on the unit prices work (see "Unit Prices" in Appendix J) since the average 7.35 points out of 10 (SD = .50) for the total group. There were no distinguishable differences between the performance of boys and girls on any of the practice worksheets.

Low-performing students (those who earned five or less points out of ten on the pre-survey) on the survey math questions were analyzed just as they were for the hunger section (Table 7). Thirty-four out of the 40 students (85%) who received half or less than half of the possible points in the math section made gains. Only four boys and two girls

had the same scores or went down from the pre-survey to the post-survey. Sixteen

students (six boys and ten girls) or 40% of the students in this sub group improved three

or more points and twelve of them actually doubled their scores. All of these results, like

in the hunger section, were significant (p<.01).

Table 7

Analyses of total knowledge scores for students who earned half or less of total possible
points on fraction section of pre-survey

Dependent	Independent Variable					
Variable	M	SD	M	SD	t-score	*P* value
	Pre-		Post-			
Total	3.88	1.02	6.10	1.96	t(78)=	<.001*
N = 40					6.35	
Male	3.78	1.16	5.67	2.22	t(34) =	<.01*
N = 18					3.20	
Female	3.95	.90	6.45	1.69	t(42) =	<.001*
N = 22					6.42	

*p<.05

In looking at the different kinds of questions from Bloom's Taxonomy for the

math section (Table 8), the results were similar to the findings in the hunger section. The

total group of students and the girls had significant gains while the boys' gains in both

categories were not significant.

Table 8

Fraction knowledge/application questions vs. analysis questions

Dependent Variables		Independent Variables							
		Analysis				Knowledge/Comprehension/Application			
		Pre-	Post-	t-score	P value	Pre-	Post-	t-score	P value
Total	N	84	75	t(157)= 2.19	<.05	84	75	t(157)= 4.36	<.001*
	Mean	2.63	3.09			2.39	3.19		
	SD	1.29	1.36			1.20	1.10		
Males	N	40	35	t(73) = .76	.45	40	35	t(73) = 1.66	.10
	Mean	2.78	3.03			2.58	3.11		
	SD	1.41	1.44			1.20	1.56		
Females	N	44	40	t(82)= 2.39	<.05	44	40	t(82)= 4.32	<.001*
	Mean	2.52	3.18			2.25	3.31		
	SD	1.19	1.34			1.20	1.03		

*p<.05

From these results, the following questions resulted in the greatest achievement:

- "You are told that you can take 20% off of your food bill. If your bill is $25.00, this means that you get $4.00 off" (analysis level true/false question where an average of seventeen students made gains; nearly two times more girls than boys)

- "Food costs go up each year. If a gallon of milk is $6.00 in 2009 and goes up $.75 each year, a gallon will cost _____ in 2012" (application level multiple-choice question where an average of seventeen students made gains; more than two times the number of girls than boys)

- " It is possible to have more than 100% of a number" (analysis level true/false question where an average of seventeen students made gains; just a few more girls than boys)

On the dichotomous question that was oriented towards students' perceptions of

their learning, participants were asked if they understood fractional numbers ("unit

prices, decimals or percentages") better than they knew them before the project began.

Ninety-seven percent of the respondents felt that the project helped them understand

these concepts better than before and this is consistent with the significant gains shown by all students on the fraction section of the survey.

Open-ended responses.

The written responses from the survey also reflect that learning took place from the students' perspectives. Participants had the opportunity to write about what they learned from the project (and could write about more than one topic, which is why there are many more responses than there are actual participants in the study) and answers fell into four separate categories. Two of these were directly related to the math and hunger concepts and two others were not intended outcomes. When given the question, "What did you learn?," there were 33 of the 95 responses (35%) that stated a better understanding of math concepts. Specifically, students made statements in their survey responses about learning how to work with unit prices, divide a price by an amount (i.e. total cost of a product divided by the number of ounces in a package) and do mental calculations. One student wrote, "I …learned how to know taxes and how to choose wich [sic] product is the better buy. Plus how you sum up all of your prices and find out wich [sic] is the better buy just by dividing."

Another thirty-two of the responses reflected how students gained a better understanding of hunger (34%). Most students specifically mentioned that they learned about the difference between a food bank and a food pantry, the extent of hunger issues in the local area and the immensity of the hunger issue throughout the world. One response that combined this understanding came from a girl who said, "not just poor countries are going hungery [sic] but our community also needs help." Another poignant

response came from a boy who wrote, "I learned that people my age are dying of hunger and I can help." One other student wrote, "I learned that there are a billion people who live on $1.00," and while this is not exactly accurate (it was explained to students that "over a billion people lived on less than $1 per day"), the information stuck with him. It was also a knowledge level question on the hunger section of the survey, and thus a part of the targeted outcomes.

One unanticipated theme about learning that came from the survey referred to the understanding of different kinds of countries. Fourteen out of the 95 responses (15%) about what was learned from the project directly stated that students did not know that there were so many Third World Countries or that there was such a major difference in the resources in each of the different kinds of countries. One student wrote, "I learned that not only 3rd world countries are hungery [sic]," while another student stated, "there are more 3rd world countries than 1st and 2nd world countries put together."

Another unexpected set of responses about what students said they learned pertained to making a difference. Sixteen responses (17%) stated that students learned about the power they had in making changes within their community. Some of the specific responses were:

- I learned that I can help a community (boy)

- I learned what we should do to help people (boy)

- I learned that no matter how young or how small you are you can make a difference in your community just donating a bit of food (girl)

- I learned that kids can do something in their community to help people in need (girl)

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- I learned that even if we are kids in a middle school we can still make a difference (girl)

- I learned that anyone can help out in the world no matter how old (girl)

Out of the sixteen responses about making a difference, three were written by boys and the rest were written by girls.

Journals.

The results from the journals revealed some of the same information about what was learned, but the percentages were a bit different. Out of the 66 analyzed responses to the open-ended question asking, "What did you learn?," there were twenty-nine comments about math concepts (44%), twenty-one about hunger (32%), twelve about the different kinds of countries (18%) and four related to making a difference (6%). Based on these results, more students wrote that they learned math concepts and fewer mentioned making a difference in the journals than on the survey. The following graph shows the results and relationship between the survey and journal results.
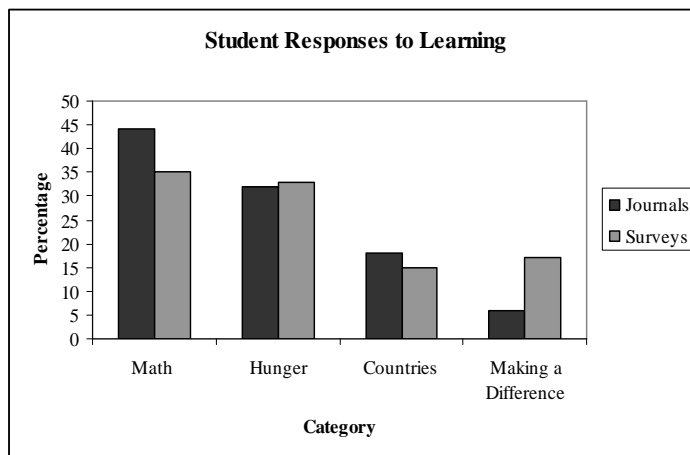
Figure 2. Student Responses to Learning

Observations.

The observational data reflecting what students learned was much more difficult to categorize than the information coming from the other data sources. Calculating the on-task behaviors that were observed during in-class lessons showed classroom engagement, but this can not be inferred as learning. Nonetheless, engagement was assessed since it was a way to quantify behaviors that could be associated with learning. Based on the data below (Table 9), it is clear that the classroom activities, intended to promote learning of math and hunger concepts were successful in engaging students. While four of the isolated sessions had lower engagement rates (between 60-67%), the overall averages for all observations was 84% for the hunger activities and 86% for the math activities. In seven out of the fifty-four 30-second observation sessions, all students were engaged in the classroom activities. There was no pattern between the times when the engagement rate was lowest or highest based on the instructional format (i.e. lecture versus small group activities), but three out of the four low engagement rates occurred during the lessons taught on "Day 3."

Table 9

Percentage of on-task behaviors from observations (Ob.)

	Ob. 1 percent	Ob. 2 percent	Ob. 3 percent	Activity & instructional format	Average percent	Day Average percent	Activity Average percent
HUNGER ACTIVITES							
DAY 1							
C1	86	82	91	Introduction (lecture)	86		
C2	67	90	X	Articles (pairs)	79	83	
C3	82	86	86	Articles (pairs)	85		
DAY 2							
C1	91	100	91	1 billion + M&Ms (lecture)	94		84
C2	77	82	100	Finding countries (small groups)	86	88	
C3	85	80	90	Hunger percentages + journals (lecture & individual)	85		
DAY 3							
C1	100	62	81	Calorie scale (small groups)	81		
C2	90	60	60	Statistics (lecture)	70	80	
C3	86	95	90	Different kinds of countries (lecture)	90		
FRACTION ACTIVITES							
DAY 5							
C1	100	90	85	Advertising + TV poll (lecture)	92		
C2	76	90	71	Advertising + TV poll (lecture)	79	86	
C3	95	80	X	Marketing practices + journal (lecture & individual)	88		86
DAY 6							
C1	100	86	71	Creating food pantry list + review (small groups)	86		
C2	81	71	86	Unit prices (lecture & individual practice)	79	86	
C3	85	100	90	Unit prices on internet (individual)	92		
DAY 7							
C1	80	85	90	Taxes (lecture & individual practice)	85		
C2	76	90	86	Taxes (lecture & individual practice)	84	87	
C3	100	80	75	Tax game (pairs)	85		

The off-task behaviors that were observed consisted of general inattention (i.e. looking around classroom, leaning back in chairs, and putting head on desk) and distracting behaviors such as writing notes to other classmates or talking to one another out of turn. Across all observations, there were 162 occurrences of off-task behaviors. Of this total number, 83 occurrences (51%) were from boys and 79 (49%) of them were from girls so the occurrences seem balanced between boys and girls. Yet it is possible that these percentages are skewed since it was difficult to determine whether the same few students exhibited off-task behaviors on many separate occasions or if many different students displayed infrequent off-task behaviors during the observations.

Several other key observations reflect student learning throughout the project, but it was difficult to know if the learning was isolated (hunger or math) or integrated. For instance, students were asked to communicate the way that fractions can be represented as percents and vice versa during hunger lessons so even when students discussed hunger, they directly referenced everything numerically. In one example, when a teacher asked students what 12% was as a fraction in reference to the number of people who are hungry or food insecure in Colorado, four students raised their hand to answer the question and a girl was called on, who then answered it correctly. On another occasion, a student tried to clarify with a teacher what "1 out of 4 people are starving" meant and the end result was that the student finally stated that this meant 25%. One hunger activity was particularly math oriented and it led to considerable disinterest or confusion for students: When they were asked to interpret various kinds of data on a document that emphasized the relationship between a country's Gross National Product (GNP) and their status as a First,

Second or Third world country, thirteen out of twenty-one students (62%) seemed uninterested or unable to do the work associated with the task.

The learning activities pertaining to unit prices and taxes seemed less daunting and reflected higher engagement. On one occasion, 76% of a class tried to calculate an optional math problem requiring them to divide the total cost of a product by the weight of the product to figure out the unit price. When a class was in the computer lab trying to solve the same kinds of problems, 75% of the students appeared to be comfortable with the task and were willing to solve all of the problems presented to them. At one time, a teacher asked students to mentally solve a problem where they had to figure out 10% of $19.50. Instantly, 55% of the students in the class raised their hands. In an isolated observation, students were in pairs playing "Tax Concentration," in small classroom groups, and one student was having difficulties playing the game with his partner. A teacher came over to the student and the following conversation occurred:

Teacher: "What is 10% of $23.40?"

Student: "I don't know." He looked around at other groups and then asked the teacher for help.

Teacher: "If you have $23.40, how many places to the left do you move the decimal point?"

Student: "I don't know." Teacher shows student how to do problem before asking next question.

Teacher: Now, if you have $21.40, what is 10% of it?"

Student: "Uh…$2.14?"

Teacher: "Good job. Try another." Student chooses another card off the floor that asks student to find 10% of $46.30 .

Student: "I think it is $4.63."

Teacher: "Nice…"

Student: "Ohhh… I get it…"

While it is difficult to know if this informal assessment of learning carried over into other contexts, the student conveyed understanding of the concept at that one point in time.

During the actual grocery store visit, observations were done as well. The learning that occurred was often cooperative and several different learning strategies were observed in the grocery stores. Students applied their math skills by conversing together and getting feedback from each other. They would often talk out the differences in unit prices and compare them with one another. Sometimes these talks included the differences between organic products and generic ones and the differences between the bright yellow sale tags and the regular ones. Here is one such conversation where two boys consider which product to buy:

Student 1: "Let's get this one" (points to box of pasta)

Student 2: "Organic is always more. Maybe we should go with Kroger [brand]."

Student 1: "Oh, there is a two for one" (student points at yellow 2/1.00 sales tag). "Maybe we should go with that"

On one occasion, a student pulled each product off the shelf, said the unit price and then put the item back on the shelf before moving on to another related product.

Another student moved from left to right on each shelf, touching each product's unit label and then saying the unit price out loud to group members.

Precise examples of engagement, by monitoring time-on-task, were more difficult to assess in the grocery stores since it was difficult to take a pulse of so many students in such a small setting at once. Students were on task most of the time and those who were not engaged would be drawn back into the process by their own group mates or roving teachers and adult volunteers. On one particular occasion, a student commented about how tuna (which was on the food list) was "disgusting." She then started to repeatedly chime "tuna" using a British accent. After three repetitions, the other two girls in the group attempted to refocus this behavior and all three were figuring out which tuna had the best unit price. It was interesting to note, though, that the student who typically pushed the cart around the store was the least involved in picking out items for the group. After seeing this as a pattern, I noted that of the fifteen groups I observed, six of them had a silent cart pusher who did not add any information or feedback to the group's decisions.

Research Question 2

   Surveys.

When students were asked how they felt about their service learning experiences, there was an overwhelming number of positive responses that were then supported by the observations that took place during classroom lessons and at the grocery stores. Yet, as can be expected, not everyone liked the project and the overall experience and suggestions for improvements were made.

When students were asked to pick out words to describe the "food drive and grocery store competition," on the survey 223 out of 244 responses were positive (i.e., "good idea," "good use of time," "interesting," or "important") which turned out to be 91% of the responses. On the other hand, 21 out of the 244 responses were more negative (i.e. "waste of time," "bad idea," "boring," or "unimportant") and this amounted to 8.4% of the total number of responses. There were no dramatic differences between boys and girls when they answered this question: 45% of the boys gave positive responses compared to the 55% of the girls who gave positive responses and the distribution was nearly equal (52% for boys and 48% for girls) for the negative responses. While this question specifically addressed the service activities and made no reference to the learning activities that preceded it, the open-ended responses that followed this question on the survey addressed all aspects of the project.

As a follow up to the question above, students were asked, "What part of the project did you like? What parts need improvement?" The hope in asking this question was to get two parts to the answer, and in 48 situations this did occur. In considering what students liked about the project, nearly half (51%) of the 79 comments in this category referred to the shopping experience and there was a fairly equal distribution for boys (22) and girls (18). While there were other activities pertaining to what students liked about the project, there were far fewer numbers of responses that fell into each one: learning activities (14%), helping others (10%), the "whole thing" (10%), the challenge/competition (6%) and the way that the project promoted independence (4%). Other answers included working with partners, going to town and the overall project idea.

In looking at how boys and girls answered this question, boys tended to comment more generally (i.e. "the whole thing"), like the independence and liked the competitive nature of the project over two times more (11 responses) than the girls (5 responses). Boys also wrote that they liked the learning activities two times more (7 responses) than the girls (4 responses). Girls, on the other hand, commented that they liked how they were able to help others nearly two times more (5 responses) than the boys (3 responses).

When asked what parts of the project needed improvement, several categories of answers occurred out of the 48 responses. The largest of these (40%) pertained to an improvement in the grocery store experience and nearly an equal number of boys and girls felt this way (47% boys and 53% girls). In particular, students stated that there should be more time to shop, more of a selection of items to buy, and more money to spend on the food. Several others commented that there were too many people at the stores and the activity was too unorganized. The learning activities were another area needed improvement according to 29% of the total responses. Nearly two times more girls than boys wrote about this and almost half of these comments referred to the journals: five boys and four girls felt that they were either too easy, too hard, too boring or just should not be done at all. One other small category was "no change," stated in 15% of the responses. There were also singular comments about needing a shorter survey, wanting to find other ways to help, making the project "more exciting" and doing a better job clarifying the overall purpose of the project.

A cross reference between students who thought negatively about the service experience and what they wrote in the subsequent question (what they liked or did not

like about the project) led to some interesting results. There were four students who gave all negative responses ("waste of time," "bad idea," "boring," and "unimportant"), but two of those students also did very poorly on the math section of the survey (no better than 40% correct). In another situation, the student did very well on the math sections of the survey (90% correct). The last student gave all negative responses when asked to choose words to describe the service aspect of the project, yet he then stated, "I liked the whole thing" and did better than average on the hunger and math sections of the survey.

Journals.

In an effort to establish reliable answers, students were given the same prompt ("What part of the project did you like? What parts need improvement?") found on their surveys. With a total of 53 positive responses, 27 of them referred to the shopping experience (51%), which was an identical response rate to the survey. Yet in this case, many more girls (63%) wrote about the experience than boys (37%). Other responses were very similar to the ones described on the survey: Learning activities (26%), helping others (13%), challenge/competition (4%), and a collection of other comments (i.e. "everything, "fun", and "not having much math to do"). The only major difference between the responses on the survey and those in the journal were the number of boys who commented about helping others (71%) versus the girls who made the same comment (21%). Girls also tended to make more general statements (i.e. "helping community"), while some of the boys were more descriptive: One boy said that he liked, "the image of poor people getting things to eat" and two others stated that they liked learning "how to donate food."

Another question in the journal asked the students to comment on "What was memorable about the project?" and "Why?" A total of 31 out of the 49 responses mentioned the shopping experience (63%) and eight students (16%) said that the speaker was most memorable part of the experience. Six of these eight students were girls (75%), but one boy's response stood out. He wrote that the guest speaker was most memorable because "he said, "there will always be hunger but you can make a difference for someone."" Other comments about the speaker included:

- "I saw how much he enjoyed helping."

- "He talked about [the food pantry]. I knew much more about [the food pantry] after that activity."

- "I learned the difference between a food pantry and a food bank."

Just as in previous findings, general statements about helping the community (10%) and the learning activities (4%) were stated as being the most memorable part of the project. One student just wrote, "3rd world activity," which does not say much. Yet it stood out for me due to the number of students who commented about it when they had a chance to write about what they learned in a previous question. "Hands on" and "group traffic in the cereal isle [sic]" were also stated.

Even when other specific experiences were stated as being memorable (i.e. the grocery store), six boys and ten girls (30% total) discussed what they learned as an explanation for their choice. This was true for six boys and ten girls. For example, one girl said that the grocery store was most memorable for her because she learned about taxes and pricing. Several students said that they liked the grocery store because they learned about "real prices" and becoming "savvy" or "smart" shoppers and a girl saw the

grocery store activity as a "test of everything that we learned." It was a boy, though, that gave the most complete response about why the grocery store was most memorable when he said, "I learned that being a smart shopper can save you money. I did this by not buying name brands and looking at unit pricing." The response may not give insight as to how the boy felt about the experience, but it does reflect positive engagement and learning.

When students were asked about what parts of the project need improvement, there were a range of very short answers. "Nothing" or no comment at all occurred in 22 of the 53 journals, but only four of these came from girls. The grocery store activity was a concern for students: there were fifteen comments (twelve of them from girls) that stated a desire to have had more money, more time, more items to purchase, or less people in the store. The only other topic that came up in this question was about learning activities: One boy wanted the journals to be more fun and a girl thought the activities were too hard. Another girl thought that there needed to be more information in the slideshows while yet another thought there needed to be more videos included in the lessons. In general, the answers to this part of the question were much more perfunctory than other written responses in the journal.

Another descriptive analysis was done to show how the length and quality of students' open-ended responses to five different journal prompts reflected on how students felt about their service learning experience. Using the three categories of "How much students wrote," "facts," and "description," students' answers were categorized and the results were calculated (Table 10). On "Day 4," the day that a representative from the

local food pantry spoke to the students, 45% of the group (25 out of 56) wrote ten or more lines in response to the prompt they were given (see Appendix J). Furthermore, thirty-nine of these students (70%) added at least one fact and 44 of them (79%) added at least one specific example in their response, which led to the highest scores in all three categories for any of the days that the students responded to prompts in their journals. Conversely, "Day 6" had the lowest scores for the total group; however, one teacher did not have her students answer the prompt that day so the results were possibly impacted by this.

Analyzing the patterns in the length of responses for individual students seemed like a good way to see if students may not have enjoyed the project at the beginning but then developed more positive feelings about it as it progressed. This was done by looking at students who may have written no response or one less than five lines long (a "1" on the matrix) for Day 2 and then increased the length of writing over the course of the project. Three girls and two boys showed this kind of change in their writing, but the growth for girls was not as dramatic as for the boys: All three girls wrote between six and ten lines of text in their response for Day 2 and then increased that number to ten or more by their last prompt. The boys, on the other hand, started out writing five or less lines for their response to Day 2's prompt and then ended up writing ten or more by Day 4 and for the rest of the entries. For Day 2, one of these boys wrote, "I felt surprised and sad. That's all though. The good thing is that we can do something." By the next prompt, however, he had written thirteen lines of text and included facts in his response whereas 66% of the rest of the students did not for this particular prompt.

The evidence also shows discrepancies in the way that boys and girls answered the prompts. On average, boys did not write nearly as much each day as the girls (girls wrote ten or more lines three times more than boys on all but Day 5), they did not include facts in their writing as much (girls included facts more than boys on all days except Day 6) and they did not include specific examples in their writing as often as the girls (true for all prompts). Yet even if boys did not, on average, write as much as girls, many would answer the question in very few words. One example, in response to the prompt for Day 5 (about the power of advertising), was short (three lines), but still included a fact and some description. The boy wrote, "They will trick you a lot and they will trick you to buy the bigger packages [sic]" The first part of the statement had no clear information, but the added piece about bigger packages fit the fact and description criteria. One other boy wrote, "It made me feel bad about all of the people who are starving," in response to his feelings about hunger for the prompt on Day 2. He only used two lines for his answer and did not get credit for giving a specific example, but because he included an explicit derivation of a vocabulary word ("starving"), he was given credit for including a fact.

There were also many more boys who did not answer the prompts at all compared to the girls. With the exception of Day 6, where nearly the same number of boys (10) and girls (11) did not answer the prompt (possibly due to the fact that a teacher did not have her class answer that prompt), boys did not answer the prompts nearly as often as girls. Over the course of the project, there were 280 opportunities to answer a prompt (56 students X 5 days of prompts). From these opportunities, there were 56 where students left the answer blank (i.e. they did not attempt to answer the prompt). Thirty-eight out of

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the 56 blanks were in boys' journals (68%), which was considerably higher than the eighteen blanks (32%) that were left by girls.

One other pattern surfaced during this journal prompt analysis. Eleven out of 56 responses for Day 3 included a reference to this saying, "Give a man a fish; you have fed him for today. Teach a man to fish; and you have fed him for a lifetime" by an unknown author. A closer examination revealed that all of the students who wrote this were in the same class. In my analysis it did not count as a "fact," but it did serve as a basis for the "specific examples" that students then wrote about in the prompt.

Table 10

Analysis of journal prompts by student

	Writing (number who wrote 10 lines or more)	Facts (number who wrote a fact in answer)	Description (number who wrote specific example in answer)
DAY 2			
Total (N= 56)	16	30	36
Males (N= 27)	2	11	13
Females (N= 29)	14	19	23
DAY 3			
Total (N= 56)	20	19	40
Males (N= 27)	5	8	16
Females (N= 29)	15	11	24
DAY 4			
Total (N= 56)	25	39	44
Males (N= 27)	6	12	16
Females (N= 29)	19	27	28
DAY 5			
Total (N= 56)	16	35	40
Males (N= 27)	5	15	16
Females (N= 29)	11	20	24
DAY 6			
Total (N= 56)	5	10	26
Males (N= 27)	0	5	10
Females (N= 29)	5	5	16
TOTAL (ALL DAYS)			
Total	82	133	186
Males	18	51	71
Females	64	82	115

Some of the responses that students wrote in their journals serve as direct testaments to their feelings about the service learning project. Twenty students (eight boys and twelve girls) stated that they want to do something to help in the community based on the lessons they learned in the classroom activities and from the guest speaker. Based on the rubric used for the survey to differentiate between positive feelings and negative feelings about the project, the idea of wanting to help could fall into any one of the four categories associated with the positive feelings (good idea, interesting, important or good use of time. In response to the prompts for Day 2 (feelings about hunger) and Day 4 (reactions to the information that the food pantry representative gave), several other responses reflect the feelings that students had about the hunger issues they learned about:

- I was surprised by what [the speaker] said about how many people they help! Also it deffenitly [sic] made [me] more caushous [sic] about judging people…It also really got me into the idea about helping donate food or be a volentier [sic] and serve the people some food. Lastly, I just get more and more excited about this project! (girl)

- I was shocked! The story about the teen really made you stop and think about how lucky you are. I was aware that people are dying from starvation or working so hard, but I wasn't educated about how much of that is really happening around the world. It's really amazing how lucky we are and how unfortunate others are. (girl)

- I felt very surprised and I didn't have any idea of how many people needed financial and dietary assistants [sic]. Although, we could do something. Not saying that in 24 hours we could stop world hunger, but we can defiantly [sic] reduce the number. I also felt that now that there will soon be a [food pantry] in _____, I could, should, and will help out more than I use to. (boy)

- What surprised me about what I learned was that even in a wealthy valley like ours, people are still starving and have no homes. After, I felt very bad for the people who were starving and have no homes. (boy)

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While these particular responses were featured, they were not unique. Words like, "shocked," "sad," and "bad" occurred frequently and were often followed by concepts that students learned from the lessons.

Observations.

My original intent was to include the findings from observational data in to this part of the study. However, the only way to ascertain students' feelings about the service learning project was to listen for words that communicate feelings during the observations. This never occurred so no observational results were included here.

Research Question 3

Surveys.

Students answered dichotomous and open-ended questions on the pre- and post-survey which posed the question, "What is the impact of the project on students' feelings about making a difference in their community?" The results from this survey (Table 11) show that all students had a high perception of their ability to make a difference even before the project started, with no less than 92% of the students saying "yes" or "true" to any of these questions. Yet between the pre- and post- survey, the percentage of total participants answering the question with a positive response still increased. Only the percentage of girls stayed the same or decreased slightly from the pre- to the post-survey and the percentage of boys who answered yes or true was always less than the percentage of girls who did.

There were several empowerment questions that only appeared on the post-survey because they referred directly to a student's experience with the service learning project

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rather than their general feelings about being able to make a difference. Fewer students stated that the *project* impacted their feelings about making a difference in the community than in previous questions. The last finding in response to, "Now that you have participated in this service project, would you choose to do a service project on your own?" was considerably lower than the other findings.

Table 11

Percentage of students answering yes or true to the following questions

Question	Pre- N = 83			Post- N = 74		
	Total	Males	Females	Total	Males	Females
I can do things to make my community (my school and town) and better place	94	43	51	95	45	50
Students my age can do things to make the world a better place	92	41	51	99	46	53
I can make a difference in my community	95	46	49	99	46	53
I can do things in school to help solve problems in my community	93	40	53	99	46	53
*After doing this project, do you feel like you can make a difference in the community?				91	42	49
*Did this project change the way you think about helping out in your community?				93	42	51
*Now that you have participated in this service project, would you choose to do a service project on your own?				74	30	44

Three open-ended questions that asked, "Why or why not?," followed the questions with stars by them in Table 11. After reviewing the findings from each question and then collapsing the data together, three major themes emerged: Serving, learning and empowering. These presented themselves through key words that fit each theme (Appendix N). There were a total of 220 responses from all three questions and the notion

of knowing how to serve, wanting to serve or being able to serve occurred in over half of the responses or 126 times (57%). Learning was mentioned in 43 responses (20%) and statements associated with feeling good (e.g. "all the boxes we could donate of food made me happy") occurred 21 times (10%). Students also mentioned that they could make a difference and would do a service project again because they could do it alone or with friends and it was easier to do than they thought it would be. Girls put statements of learning and serving in their responses more often than boys, but the differences were not remarkable. The major difference was in statements about feelings or empowerment: Boys included feeling words two times more (14) than girls (7).

Survey responses were also analyzed according to a four-point, qualitative rubric (Appendix N) in order to see the different levels of impact that the project had on students making a difference in their community. From this analysis, seven of the 74 participants stated that they did not feel like they did or could make a difference, nor would they want to do another project (9%) and this kind of response was evenly distributed between boys and girls (four boys and three girls). The second level of the rubric represented students who said they could make a difference but did not want to do another project on their own. There were twelve students in this group (16%) and there were many more boys (9) than girls (3). The next tier reflected students who thought they did or could a difference and who wanted to do another project, but they did not give any specific plan for that project. Thirty-six (49%) of the participants were in this category (fifteen boys and 21 girls). The last stage of the rubric represented students who felt they

could make a difference and gave a general or specific plan for doing a project on their own. Nineteen students (26%) fell into this category (seven boys and twelve girls).

Several specific responses stated exactly how students felt about making a difference:

- I relized [sic] that even the littlest thing you do will make the biggest impact on someone else. (girl)

- "Just the simple things will make a big difference [sic] like volunteering [sic] and donating. (boy)

- "… I got a lot of insperation [sic] to do something myself and that kids can do it too." (boy)

- "It showed me that us tiny 5th graders can make a difference." (girl)

- "I already helped so I bet I can do it again." (boy)

- "I do believe that we can make a difference because as a student I came to the realization that as one person I can't necessarily solve the world hunger problem, but I can help solve it." (girl)

From all three of the open-ended questions posed above, there were a total of 32 "no" responses. Twenty of the answers were reactions to the last question about whether or not students wanted to do another service project on their own. Again, this data was condensed into themes and the three with the highest number of responses pertained to lack of time (e.g. "I don't have time to save the world;" 22%), disinterest (22%) and feeling that doing service activities requires a group of people to help organize them (19%). Other answers, written mostly by boys, revolved around accessing resources (i.e. location and money, 9%), being worried about themselves (6%) and feeling like they had already helped (9%). Four girls (13%), on the other hand, suggested that service or helping others was overwhelming (e.g. "hunger is bigger than me").

Journals.

Most of the results came from Day 7 of the project journal, which was a series of reflective questions about the project and most of them mimicked questions on the post-survey. There were no dichotomous questions pertaining to making a difference in the community in the journals, but an initial tally of the students who started off a response to an open-ended question with yes or no (which was the intention when creating the questions) revealed that out of 54 responses, just two students (one boy and one girl) stated that the project did not help them feel like they could make a difference in their community. This means that 96% felt that the project did have an impact versus the 91% who answered the question the same way on the survey. One question that was not on the survey asked, "Can one person solve tough problems in a community?," and seven students (3 boys and 4 girls) thought that it took more people than just one to solve these kind of problems. One other question on the survey asked if students would choose to work on another service project on their own. In the journals, 11% of the students (16) said that they would not do it on their own and this was much lower than the 26% of the students who answered the question the same way on the survey. However, there were sixteen students who did not answer this question at all in the journal so it is difficult to make a direct comparison.

There were a total of 140 responses to the open-ended journal questions about making a difference in a community. Like the open-ended responses from the surveys, several important themes emerged that corresponded with the rubric used to analyze the survey questions (Appendix N). Forty-five of the responses (32%) stated ideas pertaining

to knowing how to serve, wanting to serve or being able to serve, while 20 responses communicated an idea about what was learned from the project (14%). Only one statement from a boy, on the other hand, mentioned any words that had to do with positive feelings. Other smaller themes referred to the desire to influence others about ways to solve problems (four boys) and sayings (written as quotes) that had meaning to students (e.g. "even a few dollars can save a life," if you set your mind to it, you can do anything"). One boy referenced Greg Mortenson, a philanthropist who has built many schools for children in Afghanistan and Pakistan by saying, "…if he can do that, I can do something like that."

I looked beyond the reflection page in the journal (Day 7) to all of the answers students wrote in response to the various prompts they were presented over the course of the project. In particular, I searched for references about wanting to help or make a difference in the community. Of the 270 possible times that students could have written a response to a prompt (54 journals X 5 days of prompts), there were 26 such references (eight from boys and twelve from girls), which accounted for nearly 10% of the total responses. Fifteen of the statements were in the response to Day 4's prompt (Appendix J) after the guest speaker talked about the power that students had to help hungry people in the local area. The prompt for Day 2 ("Feelings about hunger") also seemed to spark some interest in talking about making a difference since nine such responses occurred for that day. Six students wrote about wanting to make a difference in the prompts for both Day 2 and Day 4. Here are some of the statements:

- "I felt sad. I felt I should try to do more to help." (boy)

- "I think that it's a great idea that we are doing [the project] with school and it a great way to do it during math. I hope that I help a lot of people and make a difference." (boy)

- "I should, could, and will help out more than I use [sic] to." (boy)

- "We always want more and what is not good enough for us is beyond good for them…If we all keep the stuff we don't need to give to people who can't afford the world will be a better place." (girl)

- "After the talk I had viewed everything about [the food pantry] differently and I felt I could make a huge difference." (girl)

When answers to questions were analyzed according to the four-point rubric mentioned in the section above, most of the results had no more than a six point percentage difference from those in the survey (Figure 3). The one exception, with a 16 point discrepancy, was for students who said they made a difference and then had a plan for doing another project on their own. Twenty-six percent wrote about a plan they had on the survey and 41% answered the same question and included an outlined plan in their journals. A closer look revealed that all of these students came from the same class. Another notable difference was that there were three times more boys who stated that they made a difference and wanted to do more on their own without outlining a plan (12) than girls (4).

Student Responses to Making a Difference
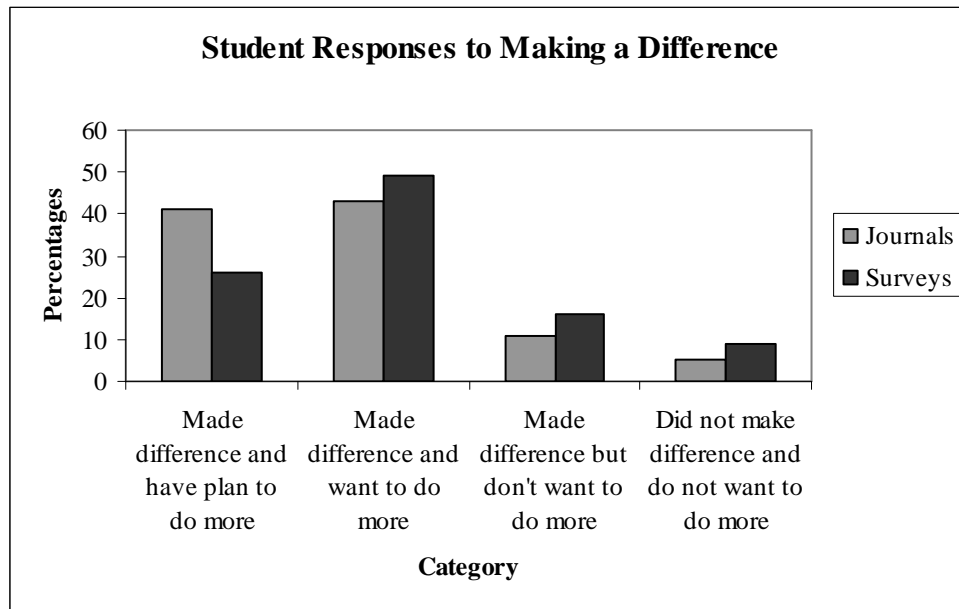
Figure 3. Student Responses to Making a Difference

While there were few students who answered no to any of the questions about making a difference, there was a common theme when students did feel that they did not or could not make a difference or they did not want to do a project on their own. The two students (one boy and one girl) who felt that the project did not help them feel like they made a difference in the community stated that they had already helped or already "knew it." Those same students did feel that one person could solve tough problems in the community, but neither wanted to do another project on their own. Yet the girl who felt this way had some contradicting statements in her journal since one of the responses to an open ended prompt said, " I am grateful that [the food pantry] helps people in need. I love helping people."

Observations.

I had hoped, just like for the last research question, that the observations would offer some data to supplement the survey and journal responses for how students felt about making a difference in their community. However, since students made no statements to this effect, there was nothing I could take from the observation data to help answer this question.

Research Question 4

As was stated in the introduction to this chapter, the results to the question, "Are there differences in how middle school students perceive, participate in and learn from service learning projects based on their gender?" were embedded in all of the other findings presented above. Doing so helped show the differences in the total group effects from those that may have varied according to gender. However, a summary of the findings are included here as well.

For the first research question pertaining to what students learned, males did not show statistical gains from the pre- to the post- survey. In fact, the only time that the male sub-groups did make significant gains was if they did poorly on the pre-survey (for both the hunger and fraction sections) and then showed significant improvement on the post-survey. Due to the nature of the survey development, the limited time between pre- and post-survey administration, and the complications of some learning coming before the project and some during, it is difficult to interpret these statistical results. They are offered here for their descriptive contribution to the reader's understanding.

On the open-ended survey questions, sixteen girls typed comments about learning about making a difference and this was far more often than the three boys who wrote the same response. Girls wrote similar responses two times more than boys for the survey question that asked students what they liked about the project. Yet for the same question in the journals, the boys wrote about liking that they could help others three times more than the girls. When students were asked direct questions about making a difference on the survey, however, there was always a higher percentage of girls who felt like their actions could make a difference in the community than boys.

A startling finding in the journals was the number of writing spaces that were left untouched and the number of questions that were left unanswered by boys. In a two-part end-of-unit reflection question asking students what they liked about the project and then what needed to be improved, eighteen out of the 22 blanks (82%) that did not have an answer for suggested improvements came from boys. This is similar to what was found on many of the pages where students were expected to respond to prompts that they were given at the end of each lesson. Out of the 56 times that prompts were left unanswered, 38 (68%) of the blanks were in boys' journals. A closer analysis also revealed that the 38 blanks were left by fourteen different boys and twelve of these boys left two more prompts blank over the course of the project.

The journal analysis that was performed in reference to how students felt about their service learning experience revealed similar results about how boys and girls wrote in their journals. In response to daily writing prompts in journals, boys wrote far less,

included fewer facts from the lessons and were less descriptive than girls. There was not one day where boys outperformed girls in this analysis.

Chapter Four: Discussion and Summary

Introduction

The purpose of this study was to describe a middle school service learning project and its influence on student learning and empowerment. It was hoped that the outcomes of this kind of project would lead to some knowledge about how to think about learning, engagement and student voice in a middle school setting.

A mixed methodology approach was used to collect data from surveys, journals and observations for the study. Eighty-four 5th grade students chose to participate in the research and all of quantitative information that was gathered from surveys was analyzed using descriptive statistics before anything else was done. Then the information from the open-ended survey responses, journals and observations was coded and organized to answer these research questions:

1. Did students learn about hunger awareness and fractions from this service learning project?

2. How do students feel about their service learning experience?

3. What were students' feelings about the project and whether they can make a difference in their community?

4. Are there differences in how male and female middle school students perceived and participated in the service learning project?

In accordance with a strategy suggested by Linda Dale Bloomberg and Marie Volpe (2008), the interpretations and synthesis of the findings in this chapter were

organized by research question and then by analytic categories (Appendix P) that allowed

for the synthesis of information across research questions. These categories were:

1. Understanding the relationship between the service learning project and student learning (research question 1)

2. The relationship between students' perceptions of learning, the positive experience and feeling that they could make a difference in the community (research questions 1, 2 and 3)

3. The difference in results according to gender (research question 4)

These categories are directly aligned with the research questions and allowed for

interpretations that went beyond the boundaries of each question. This additional level of

analysis was based on the overarching themes that emerged from the study no matter

which question was being answered or which set of data the information came from. The

intent of this process was to create a holistic picture of what the evidence from the

research suggested and how this fit in with evidence from other literature.

Research Question 1 Outcomes

On the surface, the quantitative findings from the study seemed unremarkable in

terms of the learning of hunger and fraction concepts. This was because the mean

changes in "total knowledge" from the pre- to post-survey only revealed a one to two

point gain. Upon a deeper investigation, however, there were some surprising results

about the growth of the total group and of students and those who were low performers

on the pre-survey. Survey results suggest that students demonstrated a change in their

understanding of hunger and fraction concepts over the course of the service learning

project. It is difficult to conclude if these are indicators of learning or if learning is from

the project, but in accordance with the best practices outlined in *This We Believe* (2003),

it is possible that the full integration of the delivery of the lessons was engaging enough for students and/or authentic enough for them to understand the concepts better than they did before they started the project. Another consideration is differentiation: Students who did not show significant gains may need to have lessons more individualized or leveled so that if concepts were understood well at the beginning of the project, students can be challenged to apply their understandings in new ways.

A number of students also stated that they learned about different types of countries. The activities that were geared towards helping students understand the differences between First, Second and Third world countries had more of an impact than I originally thought they would. Yet, it is probably necessary to shift semantics from the old Cold-War era terminology to "developing" and "developed" countries to reflect the changing global perspective. Since the curriculum that was used to teach hunger concepts is outdated and used old statistics and terminology, it would be better to find a more updated curriculum or create one if this project were to be implemented again.

Seeing so many students state that they learned how to make a difference in the community, in a question that asked students what they learned, was surprising. Maybe students knew that lessons were intended to be closely linked to a real-world issue and that their ultimate goal was to apply their learning to a meaningful service activity at the end of the project. Furthermore, based on the response to many of the journal prompts, the classroom activities may have created a sense of responsibility for the students who commented about wanting to help.

Equally as impressive was the percentage of on-task behaviors that were exhibited during all of the classroom lessons. The observational data revealed that on average, 84% of the students were engaged during all of the 30-second observation sessions during hunger lessons and 86% were on-task during the math lessons. The lowest percentages occurred in two separate classes during a hunger lesson, where only 60%-62% of the students were on task. Most of the time, the varied types of activities and visually-guided discussions, which are suggested as ways to engage students in learning (*This We Believe*, 2003), may have helped students participate and stay on-task, but there were several occasions where this did not work.

One set of hunger lessons revealed a much lower percentage of on-task behavior. It is possible that this was due to the challenging nature of the material presented at that time. Students were asked to apply their level of understanding of fractions to much higher numbers and for some students, this may have been overwhelming. Since the students had not worked with large representations of common fractional numbers (e.g. 10,000 out of 40,000 or 1 out of 25), nor had they ever been formally introduced to decimal multiplication or division, even asking them to use a calculator to do the computations may have disengaged some of the students who were not ready for that level of application.

During the grocery store observations, a number of strategies were used to complete the task of finding the lowest cost items and everyone seemed to have their own role within the groups. Discussing options and justifying choices in pairs was a common technique used to make purchases, but this sometimes left other group members out of

the conversation. Touching the unit price tags or saying all of the prices out loud were several of the alternative techniques that I saw students use to process or communicate the information they needed to successfully complete the task. All of these strategies seemed to work for the students who used them, but the different learning styles were evident from student-to-student and this sometimes seemed to make it hard to include everyone in the group in the decision-making process.

Research Question 2 Outcomes

Most students stated that they had a positive service experience (91%). Many students (63%) enjoyed the grocery store visit, and yet this was also an area that students felt could be improved if the project were to be done again. In particular, students felt that they should have more money, more time or more items on their list. Another suggested improvement was to spread everyone out so that there were not so many students in one place at a time. This is an important consideration since so many of the items to be purchased were located in the dry foods section of the grocery store and the aisles at the local market were so narrow. Another suggestion was to improve the journals and the types of work that students were asked to do. Some felt that the prompts were too boring or too hard. Considering how many prompts were left unanswered, this may be a valid point.

There were few students who gave all negative responses ("waste of time," "bad idea," "boring," and "unimportant") about their experience, but two of those students also did very poorly on the math section of the survey (no better than 40% correct) so it makes me wonder if math was difficult for them, and as a result, the project was too difficult for

them too. In another situation where the student gave a negative response about the experience, the student did very well on the math sections of the survey (90% correct) so maybe the whole project was too easy. The visit from the local food pantry director was the focus of the most memorable part of the project for 16% of the students. Students may also be more engaged in the messages communicated by someone other than a teacher, especially if they knew that they would have the chance to help address the problem being discussed. The journal reflections after this visit clearly reflected that the director's visit had an impact on students, since some of them included full length quotes and detailed facts about what was said that day.

It was curious that when students were asked to describe how they *felt* about the project, 30% of the participants described what they had learned. Even though the prompts were meant to evoke affective responses, students may be so trained to give academic answers that they naturally start to write about academically oriented topics. Students may also be used to reporting on facts and content-driven opinions (opinions based on what is read) rather than giving personal opinions since this is often what is expected of them on school assignments.

Research Question 3 Outcomes

The percentage of students who felt that they could make a difference in their community even before the project began (no less than 91% for any of the related questions) was incredible, but the fact that the percentage actually went up by the end of the project was even more impressive. The lowest percentages were in direct response to whether or not the project itself impacted the way the students felt about making a

difference. Therefore, it is plausible that students had a strong sense of giving to a community with or without doing this project, and this may be attributed to the community oriented culture in the school. Many of the qualitative responses, however, did suggest that students learned more about community issues and the power of their own actions than they knew before. Several students acknowledged that their understanding of service was very narrow before they did this project and only pertained to environmental issues. One student stated, "I always thought helping the community meant planting trees." This may be due to the environmental focus and "green" initiatives that permeate the culture of the local area. Students see recycling bins everywhere and environmental messages posted on the lift towers going up to the ski mountains and walls of the recreation center. It was wonderful to give the students an opportunity to see what other issues exist and how they could help.

Nearly 25% of the students stated that they would not do a service project again on their own. Several key themes emerged as to why students felt this way. Some mentioned that they did not think that one person could make a difference on their own and this may have influenced their thinking about trying to do something beyond the scope of this project. Others mentioned that they did not have access to resources they perceived as being necessary to serve on their own (e.g. money, location and people). Yet limited time was the most frequently cited reason for not wanting to do another service project on their own. The valley has a reputation for the high rate of participation in after-school activities so this was not a surprising finding. However, I would be curious to

know if students thought that purchasing and donating food meant spending all of the time learning about it the way they did rather than doing the service itself..

Similar to the pattern that was discovered earlier with one class' open-ended responses, there was another pattern that emerged in this section. When students were asked about doing another project on their own, there was a follow up question that prompted students to elaborate. The number of students who wrote about a plan for other service projects on the survey was sixteen percentage points lower than the ones in the journal, so I went to investigate further. Since all of the students who had detailed plans in their journals came from the same class (curiously, the same class as the other findings came from), I think there was some additional guidance in answering that particular question and students may have worked in pairs since some of the answers were exactly the same.

Research Question 4 Outcomes

One of the most interesting sets of findings from this study pertained to gender difference. While the total group of students and females made significant gains in all learning-based categories that were tested, males only made significant gains if they were low performers on the pre-survey for both hunger awareness and fraction questions. On the fraction section of the survey, boys had higher mean scores (5.35) than girls (4.80) to begin with so that could be a possible explanation as to why they did not make a significant gain in that area, but that was not the case for the hunger section where the mean score for boys (9.13) was slightly lower than for girls (9.25). Looking at the off-task behaviors did not offer any explanation either considering that nearly the same

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number of girls and boys exhibited those kinds of behaviors during classroom observations. Taking these results into consideration, it might be advantageous to think about and change the way that the content is delivered and perceived by boys if this study were to be replicated. Furthermore, looking closely at the results from pre-survey data before beginning the project lessons could result in some suggested changes in the procedure of the study so that various learning needs could be addressed better.

One other area where a gender discrepancy occurred was in the journals. Three different analyses were performed to gauge the length and quality of responses to the five prompts in the project journal. Not only was there a dramatic difference in the number of boys (18) who wrote an average of ten lines or more for each prompt compared to the girls (64), there were also large discrepancies in the quality of those responses. On average, boys put facts into their responses 51 times and girls did it 82 times. Boys (71) also did not add at least one specific example to their responses nearly as often as girls (115). This fit with some of the current research about gender differences in literacy (Fletcher, 2006; Gurian & Stevens, 2005). Gender differences will be discussed further in the following section.

Categorical Analysis

Category 1.

In considering the relationship between the service learning project and student learning, several key thoughts came to mind and were substantiated by other literature. Some students had had some exposure to hunger issues (possibly through popular media and past food drives) and all were taught the underlying math skills necessary to

complete this project before they started it. Between having a basic understanding of the concepts that were introduced in the project and seeing how the skills could be applied to a real-world situation, students may have been highly engaged in their learning because it touched on many of the effective practices for teaching middle school students described in *This We Believe* (2003). The same type of learning is promoted in Bloom's Taxonomy (Clark, 2004) and a similar framework developed by the International Center for Leadership in Education (*Rigor Relevance and Relationships*, 2008). This graphic organizer emphasizes the development of "rigor, relevance, and relationships," (i.e. the "3R's") in effective curricular models. Students had expectations for learning even if they were not officially graded on their work throughout the project (rigor), they learned about how the academic skills they learned in school could be applied to authentic problems (relevance), and they developed a personal connection to the cause they were being asked to support (relationships). Furthermore, students showed high engagement through their on-task behaviors, and they made significant improvements on the hunger awareness and fraction sections of the post surveys. This all serves as further evidence that students met the learning targets in the study.

Category 2.

An unintended finding from this study was seeing how the results from the first three research questions intertwined with each other in so many of the student responses and could then be condensed into three major themes: Learning, serving and empowering. This may go back to the premise of service learning- to fully integrate learning and serving in a project that allows participants to reflect on their experiences in

a personally meaningful way. The interconnection of the three themes may have also

occurred because students were given such ample opportunity to give unstructured

opinions and feedback, which has shown to be important (Eyler, 1993). Their reflections

may have been in response to prompts throughout the entire project, but they had the

opportunity to express whatever came to mind without worrying about a grade.

Furthermore, teacher quick response time (in terms of checking that a response was done)

may have served as enough timely feedback to keep students writing and this is an

important factor in student learning (Marzano, 2006; Cowie, 1995).

Qualitative responses may have naturally fallen into the "learning," "serving" and

"empowering" categories due to the way that students could apply what they learned to a

problem to which they could relate. Had the project just emphasized world hunger

without bringing the issue closer to home, the outcomes may have been different (*This

We Believe*, 2003). The project also crossed so many different subject areas (i.e. social

studies, math, language arts and reading) that even the most reluctant learner may have

found some aspect of the lessons valuable and worthwhile: Students that do not perform

well in math may have found the writing aspects of the project more appealing or vice

versa. Lastly, students may have felt that they could make a difference in the community

because the results of their actions were immediate and they could see what it felt like to

look beyond themselves (Piaget, 1977). Being introduced to the idea of a food pantry by

a local citizen who could help them understand the impact of their donations may have

created a sense of responsibility to help. It is difficult to know if this was a factor in

student thinking, but it could have had a strong positive impact as was evidenced by the

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numerous statements students made about feeling that they made a difference in the community. In the end the project most likely left a lasting impression no matter how students felt about it (Erikson, 1968).

The number of students who said that they would not want to do another service project on their own was not surprising based on the results of previous studies (Terry, 1993; Johnson and Notah, 1999). Fifth grade students are in Piaget's (1977) "Period of Operations," which means that they are able to start thinking beyond themselves, but they may not have the developmental readiness to want to do it on their own. Furthermore, personal observations suggest that students this age do not like to do things on their own and they may perceive the wording of the question they were asked to mean that they would want to do a project alone. Therefore the wording of this question might be something to be considered if another similar study were to be conducted.

Category 3.

The gender differences in the results from this study were a bit disappointing but not totally surprising. Attention was given to the way that survey questions were written and prompts were developed in hopes of avoiding some of the discrepancies in the outcomes. Yet without understanding each student's own motivations and learning styles, the difference in results may have been inevitable no matter what strategies were employed. Based on several key pieces of evidence, I find myself asking more questions than reaching conclusions:

- Were boys just not as able to learn the hunger or fraction concepts as well as girls (based on the insignificant gains on post-survey results)? If not, what could be done to lead to higher performance outcomes?

- Were the boys just not as interested in the issues they were asked to comment upon (based on the length and quality of writing in their project journals)? What could be done to pique their interest more?

- Even though the number of boys and girls that exhibited off-task behaviors was nearly the same (even though it is unclear if this is really valid since the actual students exhibiting these behaviors were not monitored closely enough), what could be done to increase engagement (based on off-task observations)?

- What can be done to increase the rate of assignment completion for boys (based on the number of prompts in the project journal that were left unanswered compared to the girls)? Do they not see the value of learning or expressing themselves as much as girls seem to do? Should other methods of reflection, besides writing, be introduced for boys?

- Does the curriculum need to be changed to reflect more of what kind of learning boys need to succeed?

Some of the research pertaining to gender achievement differences provides guidance regarding why the differences between boys and girls in this study exist (Fletcher, 2006; Gurian & Stevens, 2005), but trying to make the learning even more meaningful or engaging is a constant challenge and will require more effort. Furthermore, the project layout and types of questions students were asked on the surveys and in the journals may need to be revisited based on the insignificant gains and multiple sections left blank in boys' project journals. The gains made by low-performing boys and many of the qualitative results from this project do suggest, however, that doing more service learning projects may be a good start in helping increase achievement for boys.

Comparisons to Past Findings and Recommendations for Future Research

The results from this study were similar to many of the other findings from previous studies. In particular, students learned hunger awareness concepts just as they did in a previous study (Dewsbury-White, 1993), but unlike the previous study, there

were gender differences. Another difference was that all students in this study, including many of the sub-groups, showed some evidence of gains in learning in a project that all students were expected to do rather than just in those who volunteered to participate. Since there was no comparison group, another study, using a much larger sample and a comparison group to see if the same effects were true would be the best way to verify all results.

In keeping with the results from other studies (Johnson & Notah, 1999; Terry, 2003), a number of students stated that they would not want to do another service project on their own. Going beyond school-based projects and actually changing students' attitudes about service may take some extra effort. Doing more school-based projects, creating strong community partnerships where students could make connections with non-profit organizations and understand the volunteer opportunities that are available to them take time, energy and coordination. Looking at the effects of service beyond the classroom walls and some of the characteristics of students who make service a strong part of their life should be a focus of future research.

An emphasis on learning through engaging activities and with an authentic goal (i.e. purchasing as many grocery items as possible with a small amount of money) in mind may have helped students feel more empowered and motivated, similar to the results from previous studies (Maehr & Midgely, 1991; Morgan & Streb, 2001). Not surprisingly, students need to feel that what they learn has meaning beyond the classroom and can be applied to real-world problem solving. This is supported by brain research and

is the reasoning behind high school reform initiatives emphasizing rigor, relevance and relationships (Daggett & Nussbaum, 2008).

If this study were to be done again, the learning environment in which students answer questions should be taken into consideration. I set the questions on the online surveys so that students could not leave a question unanswered and this resulted in there being a response for every question. However, the project journals were done in class and in a less controlled setting, so it was much harder for a teacher to manage the completion of all of the assignments. In the end, this may have impacted the data results, especially for the question pertaining to students who chose not to do another service project on their own.

Another topic of consideration is the way that open-ended questions were written. Like any survey or set of prompts, word choice matters, and at times, I may have not have thought through the possibilities of how questions would be interpreted even though I did have another teacher check them over. For example, asking students if they wanted to do a service project "on their own" could have led to some students thinking that I meant that they needed to do a project by themselves rather than just making a choice to do it on their own time. Pre-testing other students in the same educational setting, who were not going to be in the study, would be away to avoid these problems in the future even though the same question was used on other groups of students and no concerns were noted.

One part of the study that was more difficult to control than anticipated was the delivery of the lessons. The results from the data showed that at least one teacher did not

follow the activity plan as closely as other teachers may have done. Leaving out a whole day of an assignment was problematic in the analyses of the findings since so much of the data for one question had to be left out. A future study would need to take this into consideration and try to make the delivery of the lessons more uniform.

This study served its purpose by describing a middle school service learning project and its potential for influencing student learning and empowerment, but the results do little more than create a snapshot of outcomes from one project with a limited participant group. Therefore, it is suggested that if the study were to be replicated, several issues need to be considered: The study should be conducted with a much larger group of students, in a more demographically diverse setting and a comparison group should be included. Furthermore, there needs to be attention given to the design of the pre- and post-surveys so that changes in student performance can be more effectively measured. There were so few students in this study that any significant gains could be attributed to a statistical regression to the mean and a pre-/post- interaction effect rather than true statistical significance.

Aside from possibly repeating this research in a larger and more demographically diverse middle school, it would be interesting to explore the roles that participation in extra curricular activities play in the results. Would students who participate in after-school activities be more positively influenced from service learning projects than those who don't? Does the level of involvement in a service learning project matter? Although part of the initial plan for this project was to let students visit the food pantry if they chose to do so, the timing did not work out. Yet, considering the number of students who

said that they learned the targeted concepts, enjoyed the experience, and felt that they

made a difference in the community, this was a successful exploration of a service

learning project.

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Appendix A

Dear Parents:

As you may have read in our school newsletter this past month, the 5th grade is getting ready to embark on a service learning project for the month of May that will integrate math skills with hunger awareness. We are at the point of the year where we want to infuse some of the math skills your children have learned this year into a meaningful project that will benefit our local community, so combining academics and community service seemed like an appropriate way to do this. The idea came from several recent articles in the newspapers about a food pantry that is being created in the local area to meet the food shortages that some community members are facing.

The project has several components. Starting in mid May, your children will spend some of their math periods looking at world hunger statistics and information from the Roaring Fork Valley to learn about some of the issues we face. Then the students will learn about unit pricing at grocery stores in order to find the best value on food. Each night, during this time, students will have a math and a journal writing assignment related to the activity so homework grades will be given.

For the last activity on Wednesday, May 27th, we would like each student to bring in a minimum of $5 that will be pooled together with other students' money and then redistributed to small groups of students. In their small groups, all of the students will then go to a local grocery store and try to buy as much food as they can with their money to donate to the food pantry that is being created in town.

During a brainstorming session, several students expressed an interest in volunteering their time to do more for this project. With this in mind, a "service committee," will meet during several lunch periods to think of ways to involve the whole school in the food drive and donation efforts. These lunch time meetings are completely voluntary and will have no impact on grades for the project.

Lastly, any 5th grade student who wants to participate in a field trip to the food pantry on May 27th will have an opportunity to do so. This will occur after the morning grocery store visit and will last until about 3:00 PM depending on which food pantry we are able to visit. Since this is a District early release day, students will miss some class time and some after school time. It is our hope that the kids will be able to visit the new one that is being created in town, but if it is not yet open, then the group will try to travel to the food pantry down valley to help organize the purchased food and get a better sense of how a food pantry works.

As you will see on the back of this letter, the project is the focus of a graduate research study and all students are requested to return the form. All information will be coded by an administrative assistant so results are completely confidential. There is no pressure for

students to participate in the study so feel free to indicate that you do not want your child to be included in the results if you are uncomfortable with your child's data being used.

If you have any questions, please feel free to talk to your child's classroom teacher.

5th GRADE HUNGER/CONSUMER MARKETING
SERVICE LEARNING PROJECT

ACTIVITY #1 (May 12th): Introduce project and discuss meaning of service (best to do this in a group discussion format like sitting on the floor in a circle; white boards are needed)

Tell the kids about the hunger/math unit we will do for the next several weeks. The purpose of it is to help students understand the impacts of world hunger and how hunger is a local problem as well. Secondly, students will learn about how to apply what they know about fractions, decimals and percents to real world situations. In the end, all of the classes will be taking a trip to the grocery store to help fill the local food pantry.

Next, discuss meaning of charity and non-profit using these questions:

How many charitable or non-profit organizations are there in the Roaring Fork Valley? Have students give some examples

Other than working in a non-profit organization, what ways can people help each other? Have students give examples

Pass out articles- one article for each pair of students. Have students read articles and then be prepared to discuss it with the class. After pairs have read the articles, have them pair up with other kids who read the same article to answer these questions

1. Many of these volunteers are young. Is it easier or harder to give time to others when you are young?

2. Some volunteers like _____ are rich and famous. Is it easier to volunteer than for ordinary people? Why or why not?

3. Altruism means giving to others without wanting or expecting anything in return. Do people ever really give altruistically without wanting anything in return like even a smile or a "thank you?"

Follow up activity or homework: What can kids do?
Challenge kids with the idea that some people think kids their age really can't do much to help their community. Ask how many kids have done things like collect money for a cause, help out a friend who is struggling, or help recycle. Selling ducks for Ducky Derby or helping out in the classroom counts too.

Have students work in pairs to come up with ideas for journal entry # 1 or send it home for the kids to do on their own.

ACTIVITY #2 (May 13th): Use fractions to help understand impact of world hunger
(normal classroom seating will be fine

Materials:
Country Cards
World Map (at least one but preferably three)
Access to blank pie graph on Smartboard
Bookmarks with hunger facts on them
M & Ms

Vocabulary:
third world/developing country- poor countries with many people and who depend on wealthier countries to support them
hunger/starvation- not getting enough to eat (starvation= extreme hunger)
malnutrition- not getting the right things to eat
food stamp- coupons that are used like money at grocery stores to purchase food for low income people
poverty (in USA based on 2005 statistics)- under $20,000 for family of four
Western Slope- most counties west of Denver
food insecurity- being hungry and fearing starvation

1) Introduce concept of 1 billion. Use online demonstration of this to help if you want or ask students how long it would take you to count to 1 billion if you said a number each second (31 years). Pass out a few M & Ms to each student. Ask how many "typical" classrooms a billion M& Ms would fill, layed out on the floor (2 2/3). Just under 1 billion people in the world are hungry and this same number of people live on less than $1 per day

2) Read "A Day in the Life a Third World Teenager" to students

3) Following the directions on pages 12 of the instruction materials, have students represent a country (some students will need to be two countries in order to use up all 30 cards, but students with two cards should countries within the same first, second or third world category). Have students work together with other students in their category to find their country on a world map- first world countries will probably be able to do this faster than third world countries so have the faster students discuss with each other what they notice about their countries in terms of size, climate, resources, etc. Afterwards, make a point of demonstrating how many countries in the world are considered "third world" countries and how this translates to the number of people who are hungry in those places. Do a fraction demonstration to figure out the percentage of first world countries (5/30 or

1/6), second world countries (3/30 or 1/10) third world countries (22/30 or 11/15) Approximately what percentage of the countries represented in this demonstration are third world countries (73%)? The data is fairly old, but the effects are still the same.

Next, draw attention to the national and local issues. Show an empty pie graph on the Smartboard and remind kids that a full pie equals 100%. Also help them understand that it is possible to have more than 100% (this will be reinforced in lesson #3). Then ask these questions (data is taken from Food Bank of the Rockies website and is based on statistics from 2005):

1) Approximately 1/10 of American households are living in poverty. This is about the same number of households who live in poverty in Colorado. What percentage is this on the pie graph?

2) "Food insecurity" means being hungry and worrying about starvation. 2% more than the number of people living in poverty are food insecure. What does this look like on the pie chart? What is the total percentage of people who are both living in poverty and are food insecure (12%)? Can you represent that as a fraction (12/100 or 3/25)?

On a blank pie graph talk about the work that Food Bank of the Rockies does throughout Colorado and pose these questions:

3) Nearly 1/5 of the people served by Food Bank of the Rockies are receiving food stamps. What percentage of the people is this (have student come draw it on pie graph Smartboard)?

4) Of the estimated 40,000 people living in poverty on the Western Slope, 10,000 are children under the age of 18. What fraction of the people living in poverty on the Western Slope are children (1/4). Show what this looks like on a pie graph (let a student come draw 25% on the Smartboard pie graph)

5) 51/100 households living in poverty have at least one adult who works full time. Show what this fraction looks like as a percent on the pie graph (51%; just over half). Discuss how this is possible

Follow up activity or homework: Feelings About Hunger and Fraction/Percent Practice. Hand out bookmarks about basic hunger facts to students

Today you saw a demonstration of how hunger impacts countries around the world and in the United States. Were you surprised by what you learned? How did today's lesson make you feel?

Math practice will have students practicing fractions into percents and interpreting a pie graph

ACTIVITY #3 (May 14th): Use statistics about world hunger to further understand fractions (normal classroom seating will be fine)

Materials:
Calorie Scale
Corn nuts or some other nut
Cookies or candy for you

Vocabulary:
Statistics- collection of number data

Remind students that you briefly discussed the possibility of having more than 100% when you talked about pie graphs in the previous lesson. Based on directions and information on pages 13 and 16 of the instructional materials, redistribute country cards to students and tell them that you are now going to look at countries in terms of the calories they consume. The daily requirement for each country is 100% (and this only pertains to calories, not to the amount of nutrients they get). Let students go write their country name next to the calorie percentage that their country consumes each day on the calorie scale. What do they notice (Only third world countries are below daily requirement)? How much more than the daily requirement do people in the United States eat (38%)? Which hemisphere do most of the countries below the daily requirement fall (the southern; that is why third world countries are sometimes called "the South")? What continent do the three lowest consuming countries come from (Africa)? Why might this be (consider climate and access to resources)?

Discuss what statistics are and how they allow us to categorize numbers so that things can be compared. Organizations use statistics to show change over time. What kinds of graphs would best represent change over time (line graphs). Look at this graph (show first world population graph) and discuss with your neighbor you think the lines mean. Why are there two different colors (developed nations versus developing or third world nations)? What do you notice about developed countries like first or second world countries compared to the third world or developing countries (developed country populations aren't growing very fast, but third world countries are)..

Now look at this statistics sheet. Circle all of the countries who have calorie intakes less than 100%. Then circle all of the countries where earned money (symbolized by Gross National Product on this sheet) is less than $1000. Lastly, circle all of the countries that have a population growth rate of 2% or more. Now look to see how many countries have circled numbers in all three columns (roughly 13 if kids do not count the "NAs"). What do all of three of these kinds of numbers mean when you think about people and hunger? What kinds of countries have circles in all three columns?

What do you think causes hunger (answers could include poverty, lack of good growing area, wars, too many people, poor transportation options for delivery of food and supplies). Get ready to discuss the rich vs. poor issue by having kids sit in their three categories: first, second and third world countries. If you talk about 100% of people in the world this would be 100 people. Have each group figure out what percent of the people their category represents (first world= close to 17% (5/30 or 1/6), second world = 10% (3/30 or 1/10) and third world= less than 74% (22/30 or 11/15). Then let them know that the first world represents 56% of the world's wealth (give them 56 corn nuts), the second worlds represents 18% of the wealth (they get 18 corn nuts) and the third world represents 26% of the wealth (they get 26 corn nuts). This is not meant to make anyone feel guilty- it is just meant to demonstrate a point. This is the reason that so many first world countries, like the United States, offer aid and relief to third world countries.

Follow up activity or homework: Reasons for hunger

Today time was spent discussing why hunger problems exist in the world. You saw the difference between wealthy people in wealthy countries and poor people in developing countries. Hunger is largely based on poverty and being able to get food. Do you think it is better to give people food or teach them to grow their own? Give reasons for your choice

Practice interpreting line graphs and growth patterns from *Investigations* math unit

ACTIVITY #4 (May 17th): Guest speaker

Speaker will talk to all 5th grade classes about hunger issues in Colorado and Roaring Fork Valley. Particular emphasis will be on what kids can do to help support local efforts to help.

Follow Up Activity or homework: Local Hunger Issues

You heard from a guest speaker about local hunger issues. What surprised you about what you learned? Write about how you felt after hearing how hunger is impacting people in the Roaring Fork Valley.

Also have kids who watch TV think about the kinds of ads they are watching during their favorite TV shows or look through their favorite magazines to notice the kinds of ads that are in them.

ACTIVITY #5 (May 18th): Understanding consumer marketing and unit pricing

Materials:
Different kinds of magazines and newspapers and circulars

Two cans of tomatoes

Ask kids to give examples of favorite types of TV shows (sports, reality TV, shows on Disney or Nickelodeon networks, drama, etc.). See if you can actually make a bar graph of the examples given to start a discussion about the kinds of ads they see when they watch the shows. Why is the graph that you created not a line graph (it does not show change over time) What about ads you see in magazines or newspapers? Are the ads intentional? Are they all of the same kinds of products? Did anyone notice of the show or shows they watched mentioned the name of a product in it (example: Coke, a favorite cereal, a toy, etc)? All of these are ways to get you to buy things.

Now think about your most recent visit to the grocery store. What do you notice about advertising there? How do the stores or food companies get you to buy things (examples: bright signs, 2 for 1 deals, coupons)? Tell students that for the second part of this project, they are going to learn about consumer marketing and use this information to make purchases to help out the local food pantry.

Show two products that are the same type of item but are different brands and sizes. Tell the kids that can A costs $_____ and can B costs $_____. If they were to go into the store and try to figure out which one was the best buy, how would they know? How do you compare two things that are different? We use unit prices. Tell the kids that can A is _____ ounces and can B is _____ ounces, and can A is $_____ per ounce while can B is $ _____ per ounce. Could they compare them now? How would they do it? Understanding how to compare items at a store or between stores will help students become more informed consumers.

Show the way in which we find unit prices on the whiteboard using the tomatoes as an example. Use other food examples (macaroni & cheese, cereal, cookies, juice, etc) to allow the kids to practice.

If time allows, have kids start working on short TV or print ads for favorite cereal. How would they get someone to purchase their product? These may be presented in front of class the next day

Follow up activity or homework: Unit prices and marketing

 In preparation for the grocery store competition, you learned about how stores try to get you to buy certain products. Are you more drawn to a product name brand or to the best price on a product you want to buy? Write about how TV commercials, magazines or computer advertisements impact your decisions.

Practice figuring out unit prices (with a calculator) is homework

ACTIVITY #6 & #7 (May 19th & 20th): Online comparisons and understanding of percentages

These two activities are linked together because two classes will be in the computer lab doing product comparisons (and creating growth patterns for certain products) and preparing their ads (see activity #5).

The other three classes will learn about the grocery store competition and start learning how to calculate 10% of items to account for taxes. Groups will also start trying to figure out how they want to divide up their purchases during the grocery store competition. Then the next day the groups will flip flop roles.

Follow up activity or homework: Coupons

Does your family pay attention to sales or cut out coupons? If you answer yes, do you feel like you buy things just because you have coupons for them or they are on sale? If no, do you think coupons really help? Why or why not?

Math homework- create a line graph representing data about increase in milk cost over time

Activity # 8 (May 26th): Grocery Store Visit

Students will work in small groups to make the most purchases from their list with the money they have. This will be a friendly competition to see who can get the best deals based on unit prices. They will need to account for sales tax as well in their purchases.

That afternoon, students who choose to visit local food pantry will hopefully be able to do so in an effort to see how their work impacts the local community.

Activity # 9 (May 28th): Project Reflection

Students take time in class to answer these questions in their journals and also take another survey (post-test) online:

INFORMED CONSENT FORM
5th GRADE SERVICE-LEARNING PROJECT

Your child is invited to participate in a study that will look at the effects of service learning on perceptions of education through a 5th grade social studies/math unit. Students will be introduced to the concept of world hunger and how it applies to the local community. At the same time, students will learn how fractions, decimals and percents are used in marketing and statistics pertaining to food and hunger. This type of process involves service learning, a combination of authentic learning and service to a community. The study is being conducted by Georgina Levey in partial fulfillment of her doctoral studies through the University of Denver. You are being asked to offer your input into this educational process to help substantiate the results of the study.

Participation in this study will include a pre- and post- project survey (developed and tested by another doctoral researcher) and voluntary submission of a journal at the end of the project. Furthermore, certain students may be the subjects of pictures used in the study. While complete confidentiality can not be guaranteed, participation in all parts of this project is voluntary and every measure will be taken to ensure that all responses are anonymous and the risks associated with it are quite minimal. If, at any time, you or your child is uncomfortable with this study, you may change your mind about participating in the study. Refusal to participate or withdrawal from the study will involve no penalty or negative alteration of grades on the final project.

Your child's responses on the surveys and journals will be identified by code number only and will be kept separate from information that could make the child identifiable. This is done to protect the confidentiality of your child's responses. Only the researcher will have access to the individual data and any reports generated as a result of this study will use only group averages and paraphrased wording. If you have any concerns or complaints about how you were treated during the study, please contact Dennis Wittmer, Chair, Institutional Review Board for the Protection of Human Subjects, at 303-871-2431, or Sylk Sotto-Santiago, Office of Sponsored Programs at 303-871-4052 or write to either at the University of Denver, Office of Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121.

You may keep this page for your records. Please sign the next page if you understand and agree to the above. If you do not understand any part of the above statement, please ask Georgina any questions you have. She can be reached at 925-3760 x 2242

Please read and sign Option #1 or Option # 2

Option #1
I have read and understood the foregoing descriptions of the study called 5th Grade Research Project. I have asked for and received a satisfactory explanation of any language that I did not fully understand. I agree to allow my child to participate in this study, and I understand that I may withdraw my consent at any time. I have received a copy of this consent form.

Signature _____ Date _____

_____I agree to let my child's journal be used for the project
____ I do not want my child's journal used for the project.

___ I agree to allow my child to be photographed and for the photos to be published
___ I do not want my child's photos to be used in the study

Option #2
I prefer not to let my child participate in this study

Signature _____ Date _____

_____ I would like a summary of the results of this study to be mailed to me at the following postal or e-mail address:

Appendix D

INFORMED ASSENT FORM
5th GRADE SERVICE-LEARNING PROJECT

You are invited to participate in a research study based on a social studies and math service learning project you will do. You will learn about world hunger and how it applies to the local community. At the same time, you will learn how fractions, decimals and percents are used in advertising and graphs pertaining to food and hunger. This is called service learning because you will learn about math and social studies while helping people in the community. The research study is being conducted by Georgina Levey, but she will not see your name on any of the work that you do for the study.

You will be asked to fill out an online survey at the beginning and end of this project and be asked to write about what you have learned. You can choose to allow your journal to be used for the study, but it is not required. Furthermore, some of you may have pictures taken of you and you can choose to allow those pictures to be used in the study.

The surveys and journals will be anonymous, which means that there will be no names on the surveys or journals so Georgina will not know whose information she has. You will participate in the service project, but if, at any time, you are uncomfortable with this study, you may change your mind about participating in it and no questions will be asked. You may do this by speaking to your teacher or Molly (the counselor).

You may choose an option below. Please read and sign whichever option works for you.

_____

Option #1
I have read and understood the description of the study described above. Even though I am signing my name here, I know that I can withdraw from the study at any time and no questions will be asked.

Signature _____ Date _____

Please read these options carefully before checking them off:

_____ I agree to allow to let my journal be used for the project

_____ I agree to let pictures of me be taken and published for the project.

_____ I do not want my journal used for the project

_____I do not want my picture used for the project

<u>Option #2</u>

I really do not want to participate in the study.

Signature _____ Date _____

Appendix E

Permission to use survey and lesson plans sent March 25, 2009:

```
Absolutely, use what you can Georgina.  I'm not sure what I can
resurrect - beyond what's in the printed dissertation - but I can
look.  You go girl!  And stay in touch, I'll look forward to what you
find out.
Kathy

kdwhite@inghamisd.org
517-244-1254


>>> "Georgina Levey" 3/24/2009 5:49 PM >>>
Hello- I am a PhD candidate at the University of Denver and am writing
my dissertation on a topic similar to the one you wrote about in 1993.
I have read your dissertation and am wondering if I could have
permission to use your surveys for my own project and also use some of
the lesson plans you created as basis for my own activities. My project
is very closely connected to what you did, but I am incorporating a
unit price math lesson into my project so that the academic component
of the service-learning project can be measured as well.

Thank you for this consideration-

Georgina Levey
```

Appendix F

PROJECT PLANS
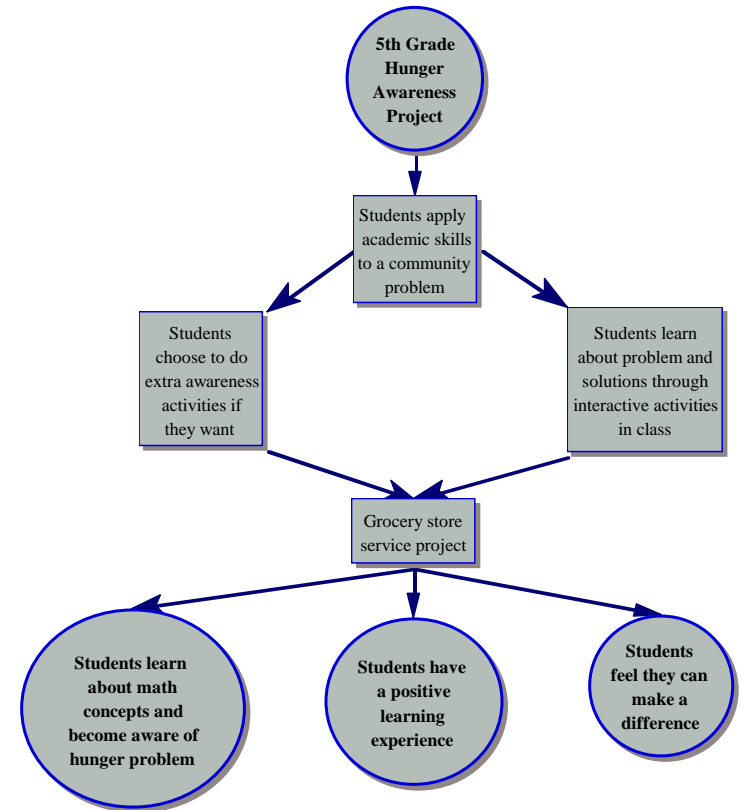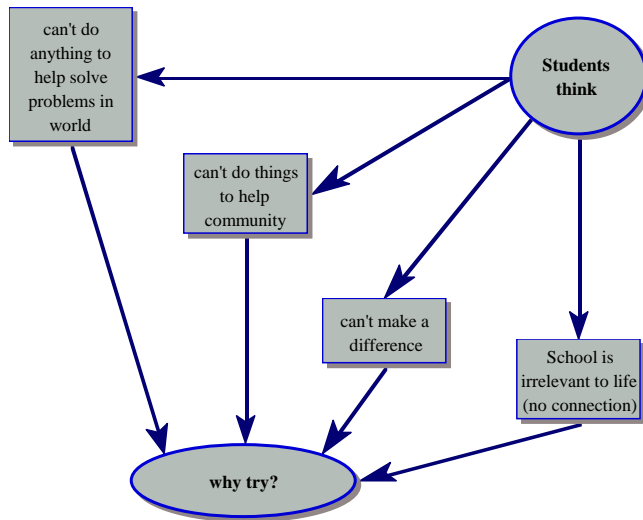
1   Who do you have for a 5th grade teacher?

2   What is the number on your notecard? Type it in here:

3   Are you male or female?
   - Male
   - Female

4   Malnutrition means not getting enough food to eat.
   - True
   - False

5   Hunger means not getting the right things to eat.
   - True
   - False

6   Over 9 million people die from hunger every year and over half of them are children
   - True
   - False

7   The main causes of hunger in the world are natural disasters like floods or lack of rain.
   - True
   - False

Starvation means dying from lack of nutrients.

- ⦿ True
- ⦿ False

---

9 Food insecurity means worrying about starvation

- ⦿ True
- ⦿ False

---

10 There is enough food to feed everyone in the world

- ⦿ True
- ⦿ False

---

11 There isn't enough land to grow the food that the world needs.

- ⦿ True
- ⦿ False

---

12 The main cause of hunger in the world is that the population is growing faster than the food supply.

- ⦿ True
- ⦿ False

---

13 The main cause of hunger is poverty, or not having enough money to buy food to eat.

- ⦿ True
- ⦿ False

---

14 A "developing" or "Third World" country means that the country is poor.

- ⦿ True
- ⦿ False

15

A food bank is an organization that collects or buys food
and then stores the food until it is given to needy people.

- ○ True
- ○ False

16 A food bank and a food pantry are the same thing

- ○ True
- ○ False

17 It is possible for a person with a full-time job to not have
enough food to eat.

- ○ True
- ○ False

18 People don't die of starvation and suffer from hunger in
wealthy countries like the U.S.

- ○ True
- ○ False

19 Over 1 billion people live one less than $1 a day.

- ○ True
- ○ False

20 Approximately 850 million people in the world are
malnourished. Of this number, nearly _____% are
children.

- ○ 10
- ○ 15
- ○ 20
- ○ 25

21 One out of every _____ people live in poverty in the United
States.

- ○ 5

○ 10
○ 15
○ 20

---

22 Of the approximately 6.7 billion people in the world, between _____ people suffer from hunger.

○ 100-300 million
○ 300-600 million
○ 600 million to 1 billion
○ over 1 billion

---

23 We live in the Roaring Fork Valley (Pitkin and Garfield Counties). In 2000, nearly _____ % of the population in this area lived below the poverty level.

○ 5
○ 11
○ 15
○ 23

---

24 In 2000, a family of three, living at the poverty level, had only about _____ to spend each year.

○ $8,500
○ $14,500
○ $20,500
○ $35,500

---

25 Of the nearly 304 million people in the United States, over ____ people don't have enough food to eat or are food "insecure" and about 1/3 of them are children

○ 36,000
○ 360,000
○ 3,600,000
○ 36,000,000

---

26 Food distributors place food at certain places on shelves to

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get a shopper's attention.

○ True

◉ False

27 Unit prices on food can help shoppers make decisions about the best price on a product.

◉ True

○ False

SUBMIT

[Your Survey Title]

28 Two brands of peanut butter come in 4 oz. containers. Peanut Butter A at $0.83 per ounce is a better buy than Peanut Butter B at $0.825 per ounce.

○ True

○ False

29 Canned tomatoes come in 5 oz. and 10 oz. cans. The five ounce can is $1.26 and is a better buy than the ten ounce can at $2.45.

○ True

○ False

30 14 oz. boxes of cookies are on a two-for-one sale at $4.99. This is a better buy than the same cookies at another store that cost $2.55 per box.

○ True

○ False

31 Ten avocados are on sale for $10. This is a better deal than $1.05 per avocado if you only need to buy five avocados

○ True
○ False

---

32   An easy estimate for tax on food is 10%. This means that
     you will pay about $5.00 on a $40.00 food bill.

     ○ True
     ○ False

---

33   A shopper will get $2.00 off of an item that was originally
     $20 if there is a 10% sale on that item

     ○ True
     ○ False

---

34   You are told that you can take 20% off of your food bill. If
     your bill is $25.00, this means that you get $4.00 off

     ○ True
     ○ False

---

35   Food costs go up each year. If a gallon of milk is $6.00 in
     2009 and goes up $.75 each year, a gallon will cost _____
     in 2012

     ○ $6.75
     ○ $7.50
     ○ $8.25
     ○ $9.00

---

36   Cereal A costs $2.00 and Cereal B costs $4.00 in 2008. If
     Cereal A goes up $2.00 each year and Cereal B goes up
     $1.00 each year, both cereals will be the same price in
     _____

     ○ 2009
     ○ 2010
     ○ 2011
     ○ 2012

---

37 It is possible to have more than 100% of a number

- ○ True
- ◉ False

---

38 I can do things to make my community (my school and my town) a better place

- ○ True
- ○ False

---

39 Students my age can do things to make the world a better place

- ○ True
- ○ False

---

40 I can make a difference in my community

- ◉ True
- ○ False

---

41 I can do things in school to help solve problems in the community

- ○ True
- ○ False

---

42 What grades do you mostly get in school?

- ○ A's
- ○ B's
- ○ C's
- ○ D's

---

43 Check any activity you are currently involved in

- ○ Student Council
- ○ In-school groups (examples: Lego Lunch, Nancy Beyea's "String" group, Hall Monitor)

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○ After school sports

○ Other after school activities (examples: music, art, theater, dance)

○ Religious groups (examples: Sunday School, Tuesday School, Jewish School)

○ Other

44   When you think about the food drive and grocery store competition, which of the words or phrases below come into your mind? You can check as many words as you want.

○ Good Idea

○ Bad Idea

○ Waste of time

○ Good Use of time

○ Boring

○ Interesting

○ Important

○ Unimportant

SUBMIT

Appendix H

Post Hunger / Consumer Math Survey

1. Who do you have for a 5th grade teacher?

2. What is the number on your notecard? Type it in here:

3. Are you male or female?
   - Male
   - Female

4. Malnutrition means not getting enough food to eat.
   - True
   - False

5. Hunger means not getting the right things to eat.
   - True
   - False

6. Over 9 million people die from hunger every year and over half of them are children
   - True
   - False

7. The main causes of hunger in the world are natural disasters like floods or lack of rain.
   - True
   - False

8.

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Starvation means dying from lack of nutrients.

- ○ True
- ○ False

9 Food insecurity means worrying about starvation

- ○ True
- ○ False

10 There is enough food to feed everyone in the world

- ○ True
- ○ False

11 There isn't enough land to grow the food that the world needs.

- ○ True
- ○ False

12 The main cause of hunger is poverty, or not having enough money to buy food to eat.

- ○ True
- ○ False

13 A "developing" or "Third World" country means that the country is poor.

- ○ True
- ○ False

14 A food bank and a food pantry are the same thing

- ○ True
- ○ False

15 It is possible for a person with a full-time job to not have

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enough food to eat.

○ True

○ False

---

16 People don't die of starvation and suffer from hunger in wealthy countries like the U.S.

○ True

○ False

---

17 Over 1 billion people live one less than $1 a day.

○ True

○ False

---

18 Approximately 850 million people in the world are malnourished. Of this number, nearly _____% are children.

○ 10

○ 15

○ 20

○ 25

---

19 One out of every _____ people live in poverty in the United States.

○ 5

○ 10

○ 15

○ 20

---

20 Food distributors place food at certain places on shelves to get a shopper's attention.

○ True

○ False

---

21 Unit prices on food can help shoppers make decisions

about the best price on a product.

○ True

○ False

SUBMIT

Post Hunger / Consumer Math Survey

22 Two brands of peanut butter come in 4 oz. containers.
Peanut Butter A at $0.83 per ounce is a better buy than
Peanut Butter B at $0.825 per ounce.

○ True

◉ False

23 Canned tomatoes come in 5 oz. and 10 oz. cans. The five
ounce can is $1.26 and is a better buy than the ten ounce
can at $2.45.

○ True

○ False

24 14 oz. boxes of cookies are on a two-for-one sale at $4.99.
This is a better buy than the same cookies at another store
that cost $2.55 per box.

○ True

○ False

25 Ten avocados are on sale for $10. This is a better deal than
$1.05 per avocado if you only need to buy five avocados

○ True

○ False

26 An easy estimate for tax on food is 10%. This means that
you will pay about $5.00 on a $40.00 food bill.

○ True

○ False

---

27 A shopper will get $2.00 off of an item that was originally $20 if there is a 10% sale on that item

○ True

○ False

---

28 You are told that you can take 20% off of your food bill. If your bill is $25.00, this means that you get $4.00 off

○ True

○ False

---

29 Food costs go up each year. If a gallon of milk is $6.00 in 2009 and goes up $.75 each year, a gallon will cost _____ in 2012

○ $6.75

○ $7.50

○ $8.25

○ $9.00

---

30 Cereal A costs $2.00 and Cereal B costs $4.00 in 2008. If Cereal A goes up $2.00 each year and Cereal B goes up $1.00 each year, both cereals will be the same price in _____

○ 2009

○ 2010

○ 2011

○ 2012

---

31 It is possible to have more than 100% of a number

○ True

○ False

32

I can do things to make my community (my school and my town) a better place

- ○ True
- ○ False

---

33 Students my age can do things to make the world a better place

- ○ True
- ○ False

---

34 I can make a difference in my community

- ○ True
- ○ False

---

35 I can do things in school to help solve problems in the community

- ◉ True
- ○ False

---

36 Which of the activities related to the food project meant the most to you?

- ○ Survey (like this one)
- ○ Guest speaker
- ○ Classroom activities
- ○ Voluntary service activities (example: lunch time meetings in Chris's room, help with organizing food)
- ○ Grocery store visit
- ○ Writing in journal

---

37 Which best describes your level of involvement in your school's food project? (**You may check more than one box**)

- ○ I brought in food
- ○ I brought in my own money

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⊙ I shopped for food

⊙ I did extra service activities (examples: participated in lunch meetings, helped organize food)

---

38 How often do you watch news on TV or read about news in a newspaper or magazine?

⊙ Often
⊙ Sometimes
⊙ Rarely
⊙ Never

---

39 Check any activity you are currently involved in

⊙ Student Council
⊙ In-school groups (examples: Lego Lunch, Nancy Beyea's "String" group, Hall Monitor)
⊙ After school sports
⊙ After school activities (examples: music, art, theater, dance)
⊙ Religious groups (examples: Sunday School, Tuesday School, Jewish School)
⊙ Other

---

40 What grades do you mostly get in school?

⊙ A's
⊙ B's
⊙ C's
⊙ D's

---

41 When you think about the food drive and grocery store competition, which of the words or phrases below come into your mind? **You can check as many words as you want.**

⊙ Good Idea
⊙ Bad Idea
⊙ Waste of time
⊙ Good Use of time

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- ○ Boring
- ○ Interesting
- ○ Important
- ○ Unimportant

SUBMIT

Post Hunger / Consumer Math Survey

42 What part of the project did you like? What parts need improvement?

43 What did you learn?

44 After doing this project, do you feel like you can make a difference in your community?

YES   NO

45 Why or why not?

46 Did this project change the way you think about helping out in your community?

YES   NO

47 Why or why not?

48 What part of the project made you feel like you like you could make a difference in your community? **(you can check off more than one answer)**

- Classroom activities
- Guest speaker
- Daily journal entries
- Grocery store visit
- Extra service activities (examples: lunch meetings, help with food organization)

49 Did this project help you understand unit prices, decimals or percentages better than you knew them before?

YES   NO

50 What part of this project helped you understand unit prices the best?

- Classroom activities
- Guest speaker
- Daily journal entries
- Grocery store visit
- Extra service activities (examples: lunch meetings, help with organizing food)

51 Did this project help you understand hunger issues better than you knew them before?

YES   NO

52 What part of this project helped you understand hunger issues the best?

- Classroom activities
- Guest speaker
- Daily journal entries

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- Grocery store visit
- Extra service activities (examples: lunch meetings, help with organizing food)

---

53 Now that you have participated in this service project, would you choose to do another service project on your own?

YES   NO

---

54 Why or why not?

SUBMIT

160

Appendix I

5th GRADE SERVICE-LEARNING PROJECT

You are about to begin a project that combines the use of unit prices in grocery stores with the theme of hunger. The purpose of the project is to help you understand the use decimals, fractions and percents in the purchase of food and then help our community by re-supplying the food pantry through a field trip to the grocery store. Those who wish to do a little extra to help the community will have the opportunity to be involved with the "Service Committee" so that we can make this food drive a school-wide event.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Activity:				Project Introduction (students choose to participate in research project or not)	**May 1** Pre-Assessment for everyone
Activity:	4 Meet with service committee (SC) at lunch	5 SC works on projects at lunch	6 SC works on project at lunch	7 SC works on projects at lunch	8 SC works on projects at lunch
Activity:	11 SC works on project at lunch	12 SC works on project at lunch	13 Day 1: introduction, articles & understanding of service	14 Day 2: world hunger & fractions	15 Day 3: world hunger & statistics
Activity:	18 Day 4: Guest speaks about local hunger issues	19 Day 5: Consumer math games & intro. unit prices	20 **Move Up Day**	21 Day 6: internet coupon searches/unit prices OR taxes	22 Day 7: internet coupon searches/unit prices OR taxes)
Activity:	25 **MEMORIAL DAY**- no school	26 Day 8: finalize plan for grocery store visit	27 Field trip to grocery store	28	29 Reflection, Post-Assessment 8:15-9:15

5th Grade
Hunger Awareness/Consumer Math
Service-Learning Project

JOURNAL
&
MATH HOMEWORK

Put Name Here:

_____

Teacher: _____

Day 1: What Can You Do?

Even though we are focusing on hunger and food collection for this service project, there are many things you could do on your own. What are some ways you can help out your community? Make a list of things you could do to help in as many of these areas as you can:

The Environment:

The Homeless:

Small Children:

The Elderly (senior citizens):

Victims of Disease (examples: cancer, heart disease, AIDS):

Victims of Discrimination (helping people earn equal rights):

Victims of Disaster (examples: fires, hurricanes, tornadoes, etc.)

Your family:

Other ideas:

If you have internet access, check out www.dosomething.org to find other ideas about what kids like you can do to help out in your community.

Day 2: Feelings About Hunger

Today you saw a demonstration of how hunger impacts countries around the world. Were you surprised by what you learned? How did today's lesson make you feel?

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Understanding Pie Graphs

Today you learned about pie graphs and how to represent different sets of fractions on them. Using the information from the pie graph below, answer the following questions:

Percentage of People Living in First, Second or Third World Countries

17%

First

10%

Second

Third

73%
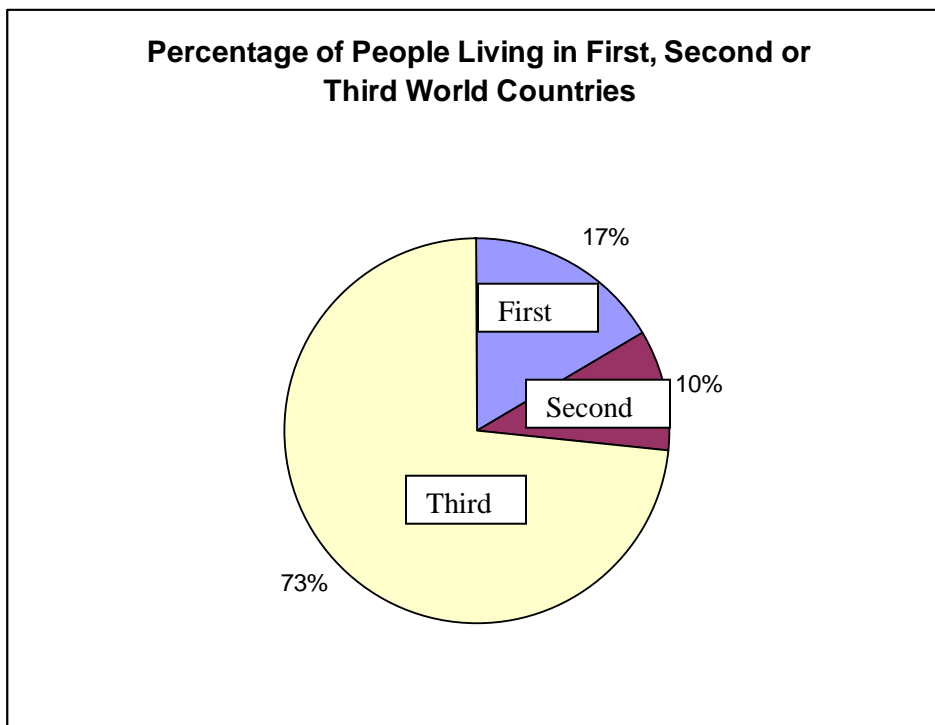
1. What fraction is the number of first world countries closest to: 0, 1/4, 1/2, 3/4 or 1?

    0   1/4   1/2   3/4   1

2. What fraction is the number of second world countries closest to: 0, 1/4, 1/2, 3/4 or 1?

    0   1/4   1/2   3/4   1

3. What fraction is the number of third world countries closest to: 0, 1/4, 1/2, 3/4 or 1?

    0   1/4   1/2   3/4   1

4. One-tenth of families in America live in poverty. Does this number equal the same size of the pie above as the first, second or third world countries?

First   Second   Third

5. 40,000 people on the Western Slope of Colorado (west of Denver) live in poverty. 10,000 of those people are children. That means that _____ people that live in poverty are children.

1 out of 3   1 out of 4   1 out of 40   1 out of 400

6. What is a way you could represent 10,000 out of 40,000 in a fraction?_____

7. What percent of people living in poverty on the Western Slope are children? _____

8. Is this percent more or less than a half?   More   Less

9. Nearly 20% of the people served by Food Bank of the Rockies are receiving food stamps. What is 20% represented as a fraction?

10. If 51/100 households that are living in poverty have one adult working full time, what percentage of households living in poverty does this most closely represent?

10%   20%   30%   50%   60%   70%

Day 3: Reasons for Hunger

Today time was spent discussing why hunger problems exist in the world. You saw the difference between wealthy people in wealthy countries and poor people in developing countries. Hunger is largely based on poverty and being able to get food. Do you think it is better to give people food or teach them to grow their own? Give reasons for your answers

_____

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Total world population

Developing regions

Developed regions

Billions of people

1. From 1800-1900, there are roughly the same number of people in "Developing regions" and Developed regions." How do you know this based on the information from the graph?

2. There are close to _____ billion people in 1900.

3. This graph was created in 2000. Why do you think there are there dotted lines from 2000-2100 on it?

4. There are close to 7 billion people in 2000. Approximately how many more will there be in 2050?

World Population 1750-2005
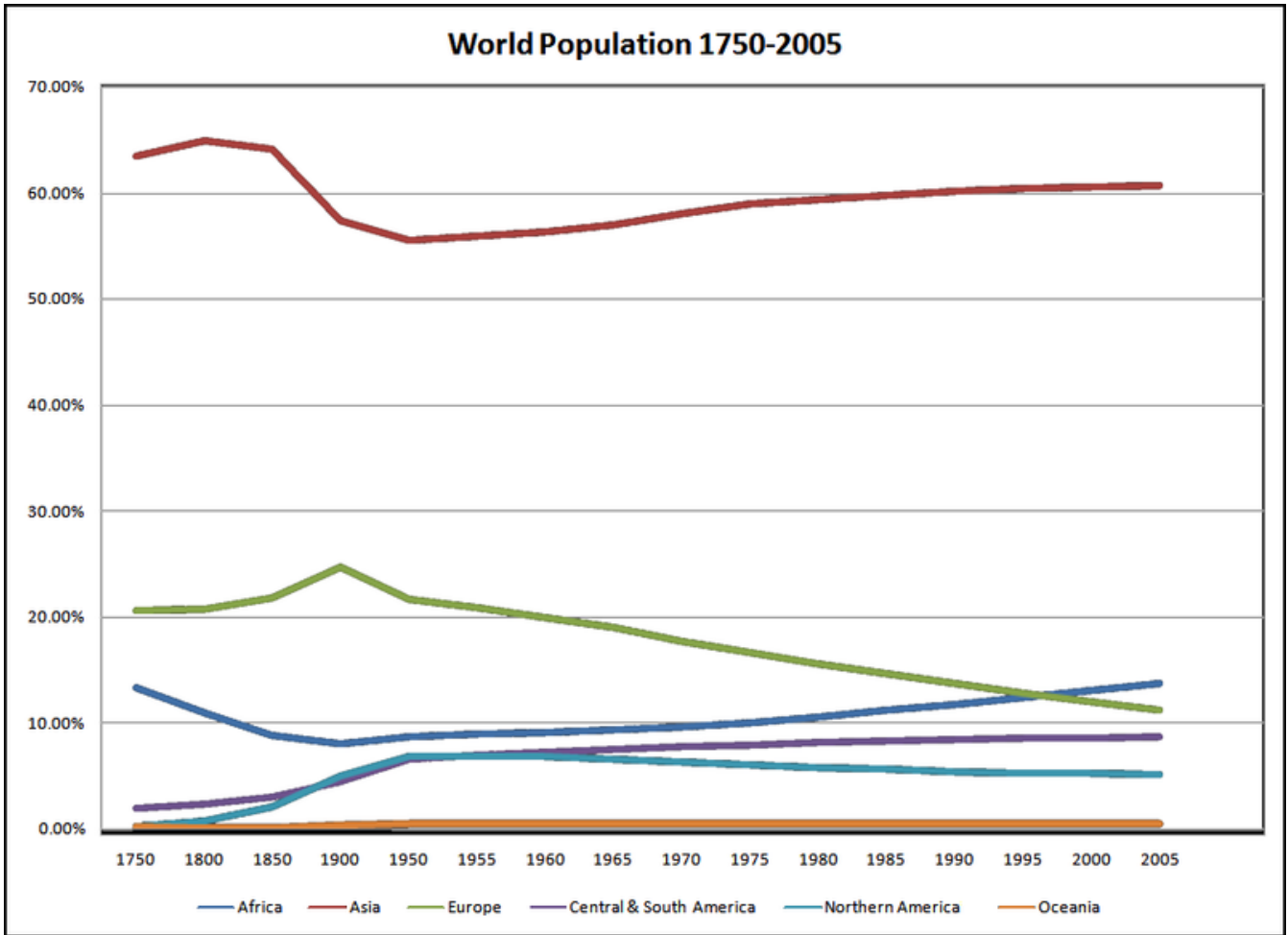
5. Which area shows the least amount of growth from 1750 to 2000? _____

6. Which three areas had the most similar population in 1950? _____,

   _____, and _____

7. In approximately what year did Europe and Africa have the same population? _____

8. Which word describes Northern America's growth from 1850 to 1950?

     Quick   Steady

   What happened to Africa's population at about the same time?

BONUS: Why do you think Northern America's population grew and Africa's did not?

Day 4: Local Hunger Issues

You heard from a guest speaker about local hunger issues. What surprised you about what you learned? Write about how you felt after hearing how hunger is impacting people in the Roaring Fork Valley.

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Day 5: Unit Prices and Marketing

In preparation for the grocery store competition, you learned about how stores try to get you to buy certain products. Are you more drawn to a product name brand or to the best price on a product you want to buy? Write about how TV commercials, magazines or computer advertisements impact your decisions.

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UNIT PRICE PRACTICE

Use the information on the price "labels" to answer the following questions:

Pasta A   **Pasta B**

Kroger Bow Tie Pasta
$1.96 Per pound **2.94**

D'Angelo's Bow Tie Pasta
$1.98 Per pound **2.97**

1. Which pasta is the better buy?

           Pasta A   Pasta B

2. What information on the label helped you make your choice?

3. If some additional information were added to the label on Pasta B that said, "2/5.00" would it be a better buy than Pasta A?

           YES   NO

4. How much would each bag of Pasta B cost if it were on sale for "2/5.00?"

5. How much off the regular price of Pasta B would the sale price be per bag?

For the next questions use these labels:

Can A

Borgan Pineapple
$2.06 Per pound **1.99**
3/5.00

Can B

Potamkin Pineapple
$2.16 Per pound **2.09**
2/4.00

6. Based on the sale prices listed above, which product is the better deal if you plan to buy the number of cans advertised?

      Can A   Can B

7. How much does each of Can B cost when it is on sale?

8. What is the difference in cost between Can B's normal cost and its sale cost per can?

9. Based on the unit price ($2.06 per pound) and the actual cost of can A ($1.99), is the size of Can A more or less than a pound?

      MORE   LESS

10. Can you still get the sale price on Can B if you only plan to buy 1 can of the product?

      YES   NO

Day 6: Coupons
Does your family pay attention to sales or cut out coupons? If you answer yes, do you feel like you buy things just because you have coupons for them or they are on sale? If no, do you think coupons really help? Why or why not?

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**<u>If you spent your class time in the computer lab today, do this assignment</u>. If you worked on taxes, do the tax sheet instead. You will do the opposite assignment for the next class period.

MILK COSTS

Your family has bought gallons of milk for the past fifteen years and you want to track the change in the cost over time. First, fill out this chart following the pattern that was started for you. Then based on the pattern you created, see if you can figure out how much milk cost at year 15.

YEAR	COST (in dollars)
1	2.75
2	3.00
3	3.25
4	3.50
5	
6	
7	
8	
9	
10	
15	

Now create a graph of your milk costs for the first ten years here:

175

TAXES

You have made your purchase at the grocery store, but you need to make sure that you have enough money to pay the tax on your bill. Estimating 10% of your total cost is a good way to make sure you have enough money left over to cover the tax cost. Here is a reminder of how to do this:

Look at the total cost of your purchase and move your <u>decimal point one place to the left</u> to see how much 10% is

Example: Total food cost = $45.00   Tax estimate = $4.50

Try this out on the problems below:

1. How much is 10% of $10.00?_____

2. How much is 10% of $100? _____

3. How much is 10% of $12.60? _____

4. How much is 10% of $36.00? _____

5. How much is 10% of $52.20? _____

6. How much is 10% of the total cost of $5.00 + $10.00 + $15.00?

7. How much is 10% of the total cost of $6.30 + $7.40 + $8.60 + $10.30?

8. How much is 10% of the total cost of $4.34 + $12.72 + $3.48 + $6.35?

9. Which is <u>more</u>: 10% of $46.20 or 10% of 42.60?

10. Which is <u>less</u>: 10% of $420 or 10% of $402?

BONUS: What is 20% of $420?   What is 5% of $420?

Day 7: Reflection

You have just finished the hunger unit and we are curious to know what you thought about the project. Please take your time to answer these questions:

1. What did you really like? What part of the project needs improvement?

_____

_____

_____

2. What did you learn?

_____

_____

_____

3. Did this project change the way you think about helping out in your community? Why or why not?

_____

_____

_____

4. After doing this project, do you feel that one person can help solve tough problems in the community? Why or why not?

_____

_____

_____

5. Did this project help you understand unit prices and percentages better than you knew them before?

                    YES   NO

6. Did what you learned in this project interest you more or less about things going on in the world?

                    MORE   LESS

7. What part of this project was memorable and why? Examples might include classroom activities, the guest speaker, the trip to the grocery story, the jobs you did as a Service Committee member or the trip to the food pantry.

_____

_____

Now that you have participated in this service project, would you choose to do another service project on your own? Why or why not?

_____

_____

_____

_____

_____

Appendix K

GROCERY STORE CHALLENGE

Group members' names:_____

Teacher: Mrs. Schenck   Amy   Holly   Noelle   Georgina

DIRECTIONS: Your group has the task of practicing unit pricing to buy as many groceries off of the list below as you can for the new food pantry. You will need to take everything into consideration (sale prices, generic brands vs. name brands, and advertising) to <u>buy at least one of each of your items on your list.</u> Then you need to keep buying as many of the items on your list as you can.

You will only have the money that is given to you and you have to leave enough to pay for taxes (estimate 10%). The team in each class that purchases the most food for their money without going over will win a refreshing treat. <u>You need to keep your receipt and show your math below in order to qualify for the prize.</u> See the backside of this sheet if you need some help remembering how to do the math.

FOOD ITEM	BRAND	UNIT PRICE	ITEM PRICE	QUANTITY	TOTAL COST
Pasta (any type)					
Pasta Sauce					
Macaroni and Cheese					
Peanut Butter					
Canned Vegetables					
Canned Fruit					
Cereal					
Dried Beans					
Rice					
Soup					
Tuna					
			SUBTOTAL (add all the total costs)		
			TAX (10% of Subtotal)		
			TOTAL (add tax to subtotal)		

EXAMPLES TO HELP WITH THE MATH

FOOD ITEM	BRAND	UNIT PRICE	ITEM PRICE	QUANTITY	TOTAL COST
Pasta (any type)	*American Beauty*	*$1.34 per pound*	*$1.06*	*3*	*$3.18*
Pasta Sauce	*Bertolli*	*$2.24 per quart*	*$2.24*	*1*	*$2.24*
				SUBTOTAL (add up all of the total costs)	*$5.42*
				TAX (10% of Subtotal)	*$.54*
				TOTAL (add tax to subtotal)	*$5.96*

YOU CAN DO ALL OF YOUR MATH WORK BELOW

Appendix L

Observation Template

Structural Layout (drawings):

Visual/Structural (notes):

Curricular and Time on Task (i.e. asking or answering related questions, writing out problems or taking notes, discussing lesson with partners or group members; looking at teacher or area where teacher is delivering lesson):

Thoughts?

Appendix M

Data triangulation matrix for study

		Evidence of understanding Hunger concepts	Evidence of understanding Fraction Concepts	Evidence about how students felt about overall experience	Evidence of making a difference
DATA TYPE					
Survey		Items 4-21 on pre-survey (no 12 or 15) Items 4-19 on post survey plus 43 and 51	Items 28-37 on pre-survey Items 22-31 on post survey plus 43 and 49	Items 42, 43, 53, 54 on post survey	Items 38-41 on pre-survey Items 32-35 on post survey plus 44-47 and 53
	Positive Support	11/15 or 73% accuracy and "yes" on item 51	7/9 or 78% accuracy and "yes" on item 49	Themes and "yes" on item 53	**"yes" on items 44, 46 and 53**
Journal		Day 7→ questions 2 and 6 (look for connection with question 43 from post survey)	Day 7→ questions 2 and 5 "Understanding Pie Graphs" "Unit Price Practice" "Taxes"	Days 2, and 4 plus answers to questions 1, 2 and last one on Day 7	Day 7→ questions 3 and 4
	Positive Support	Related themes (item 43 on post survey with question 2 from Day 7 in the journal) plus "yes" on item 51 on post survey	Themes and correlations (between item 43 on post survey and question 2 from Day 7; also item 49 on post survey and question 5 from Day 7 in journal)	Related themes from Item 43 on post survey and questions 1 and 2 from Day 7 plus items 53 and 54 on post survey with the last question on Day 7 in journal (average of 3 or higher on rubric)	Related themes between items 46 and 47 on post survey and questions 3 and 4 on Day 7 in journal (average of 3 or higher on rubric)
Observation					
	Positive Support	Quotes	Quotes	Time on task Quotes	Quotes
GENDER DIFFERENCES					
Male					
Female					

Appendix N

ANALYSIS RUBLRICS AND TEMPLATES

Analysis Rubrics for Research Questions 2 and 3

Rubric for Measuring Service Learning Experience

Negative	Positive
Student states that experience was "unimportant," a "waste of time," "boring," or a "bad idea"	Student states experience was "important," "good use of time," "interesting" or a "good idea"

Rubric for Measuring Making a Difference

No	Yes, but no more	Yes, but not specific	Yes and plan stated
Student states that he did or could do nothing to make a difference or that he did not like project	Student states he did or could make a difference, but would not want to do another project	Student states he did or could make a difference and wants to do another project, but no specific plan is stated	Student states that he will do another project and possible plan was mentioned even if it is a general one (i.e. "work with friends")

Key Word Analysis for open-ended survey questions about making difference in community		
SERVING	**LEARNING**	**FEELING GOOD/EMPOWERMENT**
Give	More information	Feeling better
Do	Community issues	Interesting/ enjoyable
Help (can or want to)	Hunger terms	Happy
Donate	Math terms (unit prices)	Fun

Matrix used for journal prompt analysis																
		Amount of Writing (in lines)					**Fact (is one from lesson included?)**					**Description (noun + specific example)**				
	CODE	1-5 = 1; 6-10 = 2; 10+ = 3					Yes = 1; No = 2					Yes = 1; No = 2				
ID#	M/F	D-2	D-3	D-4	D-5	D-6	D-2	D-3	D-4	D-5	D-6	D-2	D-3	D-4	D-5	D-6

Appendix O

Survey questions categorized according to Bloom's Taxonomy (Clark, 2004)

Hunger Questions	Knowledge/ Comprehension/ Application	Analysis
Malnutrition means not getting enough food to eat	X	
Hunger means not getting enough food to eat	X	
Over 9 million people die from hunger every year and over half of them are children	X	
The main causes of hunger in the world are natural disasters like floods or lack of rain		X
Starvation means dying from lack of nutrients	X	
Food insecurity means worrying about starvation	X	
There is enough food to feed everyone in the world		X
There isn't enough land to grow the food that the world needs		X
The main cause of hunger is poverty, or not having enough money to buy food to eat		X
A "developing" or "Third World" country means that the country is poor		X
A food bank and a food pantry are the same thing	X	
It is possible for a person with a full- time job to not have enough food to eat		X
People don't die of starvation and suffer from hunger in wealthy countries like the U.S.		X
Over 1 billion people live on less than $1 a day	X	
Approximately 850 million people in the world are malnourished. Of this number, nearly _____% are children	X	
One out of every ____ people live in poverty in the United States	X	

Fraction Question	Knowledge/ Comprehension/ Application	Analysis
Two brands of peanut butter come in 4 oz. containers. Peanut butter A at $0.83 per ounce is a better buy than Peanut Butter B at $0.825 an ounce	X	
Canned tomatoes come in 5 oz. and 10 oz. cans. The 5 ounce can is $1.26 and is a better buy than the ten ounce can at $2.45	X	
14 oz. boxes of cookies are on a two-for-one sale at $4.99. This is a better buy than the same cookies at another store that cost $2.55 per box		X
Ten avocados are on sale for $10. This is a better deals than $1.05 per avocado if you only need to buy 5 avocados		X
An easy estimate for tax on food is 10%. This means that you will pay about $5.00 on a $40.00 food bill	X	
A shopper will get $2.00 of an item that was originally $20 if there is a 10% sale on that item	X	
You are told that you can take 20% off of your food bill. If your bill is $25.00, this means that you get $4.00 off		X
Food costs go up each year. If a gallon of milk is $6.00 in 2009 and goes up $.75 each year, a gallon of milk will cost _____ in 2012	X	
Cereal A costs $2.00 and Cereal B costs $4.00 in 2008. If cereal A goes up $2.00 each year and Cereal B goes up $1.00 each year, both cereals will be the same price in _____		X
It is possible to have more than 100% of a number		X

Appendix P

Outline of findings

Finding 1

- Significant gains for total group of students from pre-post- survey for fraction and hunger concepts
    - True for almost all sub-group analyses too (exception = males)
- High percentage of on-task behaviors to suggest high engagement
- High number of comments about learning about different types of countries and about making a difference

Finding 2
- High percentage of students had positive experience
    - High number of students liked the grocery store visit
    - Better organization or more resources for grocery store visit and altering some of the learning activities could use improvement
- Many comments about "learning" in describing the experience
- Connection between students who did not like the experience and their performance results?
- Speaker had strong impact on students on written responses to prompt→ longest entries
- Cluster of similar responses(fish reference)→ same class; may have been strong discussion point or even printed on board…

Finding 3
- High percentage of students (>91%) of students thinking the can make difference even before project started→ still went up
- Lowest percentages in reference to the "project" actually influencing students to make a difference, but still high
- Lowest percentage (74%) for students not wanting to do another project on their own
    - Don't have access to resources or motivation?
    - Need people to do it → not just one person
    - Willing participants in school?
- High percentages of references to learning, serving and feeling good
- Big discrepancy between students who created plan for doing projects on own on survey vs. in journals?
    - One class→Class discussion or specific instructions?

Finding 4
- Boys did not have significant gains for total knowledge (hunger or fractions) or when questions were categorized according to Bloom's taxonomy
- Boys did have significant gains if they were low performers on the pre-survey (hunger and fractions)
- Boys did not write nearly as long responses to prompts in journal and many more left undone than girls

Analytic Categories
Category 1: SL project did increase student performance on hunger and fraction questions

- Why?
  - Integration of previously taught skills
  - Interesting (high engagement)
  - Applies to real world issues and problem solving
  - No emphasis on results or grades

- Literature support: focus on active learning, relevant, exploratory, integrative, challenging→ all practices advocated by *This We Believe* (2003). 3Rs (Daggatt and Nussbaum, 2008)

Category 2: Students had a high perception of learning and feeling that they could make a difference. They also stated that they had a positive experience

- Why?
  - Activity based/interactive
  - Allowed to express opinions freely often and received consistent feedback without penalty
  - Applied to local and global issues that kids could relate to
  - Integrative→ crossed many subject areas (SS, Math, LA, Reading)
  - Problem based
  - Immediate results→ can see the power of their actions

- Lower percentage of kids who think that the would do a project on own
  - In keeping with research that suggests civic engagement may not extend beyond scope of project (Johnson & Notah 1999; Terry, 2003)

- Literature support: 3Rs (Duggatt & Nussbaum), This We Believe and Turning Points; Piaget (thinking abstractly and beyond selves) and had say in learning (Scales, 1999; Morgan & Streb, 2001); constant and meaningful reflection may have mattered (Eyler, 1993)

Category 3: Boys had different results than girls

- Why?
    - Not as interested in issues (quality of prompt responses) and learning (occurrences of learning statements)
    - Not as engaged (off-task results)
    - Not as interested in assignments (poor completion rate and number of lines was considerably less than girls)

- Literature support: environmental factors (Fletcher, 2006): biological factors pertaining to language (Gurian & Stevens; 2005)