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Exploring Problem Based Learning to Promote 21st Century Learning Skills in Full Day Kindergarten

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COLLEGE OF EDUCATION

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M.A., Olivet Nazarene University, 2007

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

The kindergarten program at the study site transitioned from half day to full day, yet the curriculum was not updated to accommodate the full day schedule, or to include best practices. In order to prepare learners for their future in education, activities were implemented to determine how problem based learning can promote acquisition of the 21st century learning skills. The purpose of this qualitative study was to create and implement an effective, full day curriculum that promotes 21st century learning skills for kindergarten students. This project, rooted in constructivism which allows for active and social learning, supplements the existing half day curriculum and encourages collaborating, experiential learning, and problem solving. The question that guided this project study involved understanding how 21st century learning skills of collaboration, problem solving, effective communication, and decision making can be integrated into a full day kindergarten curriculum. A qualitative participatory action research framework was used to gather data in the form of field notes during observations and interviews were coded and analyzed to find themes and categories that emerged. The findings revealed that 21st century skills can be acquired by kindergarten learners when the role of the teacher changes into a facilitator and models appropriate behaviors and skills. The final project includes a teacher's guide to support teachers as they transition into a new role as a facilitator as well as sample lessons with suggestions and hints for implementation. This project contributes to social change by presenting teachers with a data driven curriculum that offers an authentic, experiential way of teaching to help students develop skills necessary to become successful members of their classroom.

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Section 1: The Problem

The purpose of this doctoral project study was to use data-based decision making to develop a series of problem based learning (PBL) pilot lessons for kindergarten students in the Evelyn School District in order to (a) extend the current half-day program to a full-day program, and (b) to give kindergarten students access to curricula that promotes 21st century learning.

Constructivist theorists including Dewey (1938/1997) and Bruner (1966) contended that knowledge is best constructed using a learner-centered approach accounting for individual interest and experience. Dewey and Bruner used the term engaged learning to describe how providing students with unique learning opportunities is related to students constructing meaning. The constructivist learning theorists argued that students that learn using rote memory and drill are not energized by their work as they would be if the work was meaningful and experiential (Bransford, 1979; Bruner, 1966; Dewey, 1938/1997; Fyrenius, Bergdahl, & Silén, 2005). Meaningful, thought provoking lessons that promote student-centeredness and active learning are apparent in a constructivist classroom (Kotzee, 2010). These lessons allow students to investigate and experience learning with their classmates. The material is relevant to their lives and they build relationships with other students as they learn together.

In doing so, the learners are developing and exhibiting 21st century learning skills. These behaviors and skills, such as collaborative learning, effective communicating, decision making, and problem solving are required in the 21st century workplace where standardized test scores do not determine how well one thinks, problem solves, or

collaborates (Pappas, 2009). If students are expected to demonstrate these skills after graduation, then a curriculum that encourages problem solving, learning through social interactions, and exploration is needed before graduation (Fletcher, 2007; Pappas, 2009). PBL is a method of teaching and learning that engages students and begins to develop the skills necessary for the 21st century workplace (Hmelo-Silver, 2004; Kumar & Natarajan, 2007). When students experience learning by problem solving they develop new understandings and gain new ways of doing things (Capobianco & Tyrie, 2009).

I gathered classroom data in order to guide the creation of these PBL lessons to ensure that they (a) best supplement the mandated reading, language arts, math, and writing curriculum already in place and (b) afford opportunities for 21st century learning to occur with the kindergarten students in the Evelyn, Illinois school district. In this section, the problem will be defined and supported with evidence from the school district and the available literature on this topic. Important terms will also be defined for the purpose of this study. The significance of this project will be explained as it relates to educational issues on a larger scale. Implications for further research and other possible projects will also be shared.

Definition of the Problem

The problem addressed in this study is that in the Evelyn School District the kindergarten curriculum does not fulfill the full day kindergarten schedule and the current curriculum does not encourage 21st century learning skills. This is a problem because kindergarten students are not being afforded opportunities to learn social studies and science content as well as life skills to prepare them for future educational and career experiences.

Background of the Problem

Full day kindergarten is a program offered to schools through state aid or grant funding (Brooks, 2008).This program is based on the number of available classrooms and qualified teachers as it provides a variety of additional learning and social interaction experiences for young learners. Students in these programs are exposed to reading, math, writing, and science instruction (Chang & Singh, 2008). Full day kindergarten students attend school 5 days a week for about 6 hours a day (Chang & Singh, 2008). Full day kindergarten is being debated in many school districts in the United States and currently half of all public and private schools have transitioned into full day programs (Lee, Burkam, Ready, Honigman, & Meisels, 2006). The Evelyn schools transitioned all of the kindergarten classes to full day programs in 2008 but the curriculum has not changed since the half day program was being implemented.

Since the responsibility of learning belongs to the students and the responsibility for creating an optimal learning environment and learning experience belongs to the instructor (Dewey, 1938/1997), it is the responsibility of the district to offer students a curriculum that stimulates these kindergarten students while encouraging them to become self-motivated and engaged learners. Currently, different teaching and learning methods are being implemented by the team of kindergarten teachers in the Evelyn school district. However, the district is attempting to work with the materials that they already have and simply change the teaching method.This will impact all learners that start their education in the Evelyn School District kindergarten program because with a traditional curriculum, they are not being given the opportunity to learn in a way that motivates them and encourages discovery, critical thinking, and enthusiasm. In many cases, kindergarten is

the first experience children have in a school setting and the first chance teachers have to immerse the children in active learning (Gullo, 2006).

The purpose of this project study was to address this problem by researching, creating, and pilot testing a PBL curriculum that will later be implemented in the kindergarten classrooms in the Evelyn School District. PBL was chosen as this type of teaching and learning utilizes a student-centered approach that promotes self-directed learning (Beacham & Shambaugh, 2007). This style of learning calls for student collaboration and exploration to solve problems (Skowron, 2006; Torp & Sage, 2002). The PBL lessons were used to supplement the mandated literacy curriculum in order to determine whether or not 21st century learning skills can be afforded to kindergarten learners during a full day schedule. Initial data were be collected in order to guide the direction of the creation of curriculum from interviews with the teacher and careful observations of the children in their classroom. Instructional materials and sequences using PBL philosophy were designed and tested in one kindergarten classroom. The final project reveals a teacher's guide for creating and implementing PBL lessons that are grounded in data that has been collected throughout this study and have been guided by what the research uncovers.

Rationale

Evidence of the Problem at the Local Level

The Evelyn School District has been placed on Illinois' academic watch list due to underperforming scores on the Illinois Standards Achievement Test (ISAT). The first mandated state test taken in this district is the ISAT in third grade. In 2008, 39.1% of the third grade students performed below standards in reading and 25.3% scored below

standards in math (Evelyn School District 143 Illinois District Report Card, 2008). As it is not making adequate yearly progress, the Evelyn School District has been placed on the academic early warning state status.

A high percentage of the students performing below grade level in the Evelyn School district are economically disadvantaged. These students are classified as low income because they receive public aid, live in shelters, are supported by foster parents, or are eligible to receive free or reduced price lunch (Evelyn School District 143 Illinois District Report Card, 2008). The population of the Evelyn School District is 29.1% economically disadvantaged students (Evelyn School District 143 Illinois District Report Card). These children are at a higher risk of underperforming due to the lack of early literacy experiences, lack of motivation, limited vocabulary, and poor attendance due to the high mobility rate (Hemphill & Tivnan, 2008; Schroeder, 2007).

According to Schroeder (2007), early intervention, such as full day kindergarten programs, can build important early educational experiences. The impact of full day kindergarten can enhance students' academic, social, and motor skill development (Hendler & Nakelski, 2008). Schroeder conducted a 3 year study with early childhood learners. He examined the relationships between half day students' test scores and the effects of poverty as well as the relationship between full day students' test scores and the effects of poverty. Schroeder's results show an increase in scores when children living in poverty attend full day kindergarten. "The gain in scores attributed to full-day kindergarten amounted to almost what was lost from the effect of poverty" (Schroeder, 2007, p. 427).

Pressures to make gains on the mandated state assessments impact lessons in the classroom (Abrams, Pedulla, & Madaus, 2003). Choosing and implementing a curriculum that meets the needs of the learners preparing for high stakes testing and life after school is essential (Abrams, Pedulla, & Madaus, 2003; Kay, 2009). According to Krynock and Robb (1996), students learning in a PBL environment scored higher on assessments than students learning in a traditional learning environment. Along with higher scores, student feedback indicated that the PBL learners had acquired more than the required content and had developed collaborating and presenting skills (Krynock & Robb, 1996).

Kindergarten students can benefit from an engaging and interactive curriculum where they are encouraged to explore and discover new content as they learn (Lambros, 2002). Children that begin their education in the Evelyn School District are at a disadvantage because they attend school for the full day, but are being taught using a half day curriculum and they may not be spending time during the school day as engaged learners (Chang & Singh, 2008). Life after graduation does not require the memorization of facts but instead calls for creative, critical thinkers that can question, reflect, and go beyond simply finding an answer (Pappas, 2009). These thinkers need to be able to investigate and work with others to construct new understandings and find several possible solutions to any given problem (Pappas, 2009). The Evelyn School District could benefit from a curriculum that prepares students for the rest of their education as well as for their careers.

Evidence of the Problem from the Professional Literature

Schools in Indiana and New Jersey have made the transition to full day kindergarten and are being exposed to the evidence showing the benefits for all students,

but especially for at-risk students (Brooks, 2008). Low income families and families with at-risk students in particular gain from full day kindergarten programs as parents are allowed to work during the school day and not have to pay for childcare (Brooks, 2008). The children are at an advantage as their reading, writing, and word recognition skills are increasing and drop-out rates among at-risk students are decreasing (Brooks, 2008; Manzo & Robelen, 2003).

As basic skills increase, the development of 21st century skills and behaviors can develop as well to prepare the students to become independent thinkers, problem solvers, and decision makers (Silva, 2009). According to Silva, acquiring the "newly important thinking and reasoning skills" (p.630) is now just as important as learning the basic skills. Theorists like Dewey, Vygotsky, and Bruner emphasized the importance of inquiry, information gathering, application, and problem solving (Pappas, 2009; Silva, 2009). These 21st century skills are therefore not new, they are just newly important and are now required in a workplace that uses computers to complete routine tasks and independent, creative thinkers to make decisions and solve problems (Silva, 2009).

Definitions

Problem-based learning (PBL): A teaching method that allows students to work together, think critically, and solve real-life problems while engaged in a deep learning experience (Pepper, 2009; Torp & Sage, 1998). PBL is an experiential way of learning that uses real-world, messy, ill-structured problems to engage students, capture their attention, and challenge their thinking (Torp & Sage, 1998). It also helps students to find solutions in a learning environment, guides student inquiry, and focuses on investigation. PBL is a method of learning that uses problems to create new experiences by building off

of prior knowledge and incorporating relevant, meaningful topics to explore (Lambros, 2002). PBL is a pedagogy that presents students with problems and requires them to define the problem, develop a hypothesis, and analyze and use data from several sources (Sungur & Tekkaya, 2006). PBL places the responsibility of accessing information on the students so that they can achieve goals, monitor their own understanding, and develop into self-regulated learners (Sungur & Tekkaya, 2006; van den Hurk, 2006).

Self-regulated learning: Learning that involves thinking and doing, as well as having interactive learning experiences with the environment (Zimmerman, 1989 as cited by Sahin, 2007). It involves being an active participant in the learning process rather than a passive receiver (Sahin, 2007). Self-regulated learners monitor their own behavior and thinking during the learning process (Sorić & Palekčić, 2009). Self-regulated learning also involves students evaluating their own performance (Sorić & Palekčić, 2009). This learning process involves organizing and choosing strategies to help acquire knowledge (Zimmerman, 2008).

21st century learning: A student centered type of learning that facilitates collaboration, encourages decision making and problem solving, promotes the development of technological skills, and increases effective communication (Ben-Jacob, Talia, Ben-Jacob, & Levin, 2000; Breivik, 2005; Carroll, 2005; Crawford, 2003; Leh, Kouba, & Davis, 2005; Loertscher, 2007). 21st century learning is integrated and interdisciplinary. It emphasizes learning through investigation, much like PBL, and focuses on individual student needs.

Participatory action research (PAR): A process in which the participants of the study collaborate to identify the problem and seek a solution to create change (Selenar,

1997 as cited by Garcia-Iriarte, E; Kramer, J.C., Kramer, J.M.; & Hammel, J., 2009). In PAR, the participants are coresearchers and are involved in carrying out the research for the study (Elwood, 2009). PAR is conducted to support the action being taken in the study to address the need for change (Elwood, 2009).

Significance

Due to the fact that many households are now single parent or have both parents working full-time, many kindergarten programs have moved from half day to full day (Gullo, 1990 as cited by Hendler & Nakelski, 2008; Lee, Burkam, Ready, Honigman, & Meisels, 2006). In an attempt to supplement the mandated curriculum of the first half of the school day and fulfill the second half of the full day program meaningful lessons are being incorporated. During the recently added extended school day in the Evelyn School District, the pilot PBL curriculum will be implemented. The children can benefit from the new curriculum as they approach learning by experiencing it and thinking globally rather than always searching for the one correct answer (Loertscher, 2007). Students will be presented with real world problems which will heighten their awareness of local problems and develop strategies to solve the problems (Khalid, 2010). These kindergartners will become 21st century, inventive, creative learners, according to Loertscher (2007), and do just as well on standardized tests as students that learn using traditional methods. Full day kindergarten is linked to achievement, higher test scores, and lower drop-out rates (Schroeder, 2007). The implementation of PBL will benefit the kindergarten students as they receive early interventions and educational experiences they would not have otherwise had regardless of their socioeconomic status.

In addition to being of benefit to these kindergarten students both the research that will guide this project and the final curriculum project itself will be of use to both researchers and practitioners alike as they will inform the field of the ways in which PBL experiences can be incorporated into early elementary education in order to obtain 21st century learning skills.

Guiding/Research Question

The question that guided this project study is: How can the 21st century learning skills of collaboration, problem solving, effective communication, and decision making be integrated into a full day kindergarten curriculum? In an attempt to promote critical thinking, collaboration, and self-directed learning, a problem based science and social studies curriculum is being created, implemented, and revised based on teacher and student input collected through observations and interviews to see if 21st century skills are afforded to kindergarten learners in a full day program. As the Evelyn School District transitions from half day to full day attendance, the curriculum remains the same. The current full day curriculum lacks a science and social studies component. This study was designed as an extension to the current curriculum to enhance the learning experience and accommodate the full day learner. The pilot lessons were implemented to determine if the students' needs are being met and to uncover different strategies for reaching all learners.

Addressing the Gap in the Literature

There have not been many studies conducted using PBL and early elementary students. The research available showed that PBL is an effective tool in many educational systems. After sifting through journal articles and books on problem-based learning, I found that it has been integrated into curricula at the middle school, high school,

undergraduate, graduate, and post-graduate levels (Ben-Jacob, Talia, Ben-Jacob, &

Levin, 2000). Community colleges and web-based learning environments have adopted

problem-based learning into their courses as well. In other fields such as, business,

engineering, and medical schools, problem-based learning is commonly used (Ben-Jacob

et al., 2000). Elementary school students are exposed to this unique style of teaching and

learning; however, research on its outcomes is lacking when it comes to kindergarten

students learning in a problem-based environment. The majority of literature available

involving PBL and kindergarten is in books with implementation strategies at all different

grade levels. Kindergarten is often combined with first grade in these books and very

little specific grade level information is provided. I addressed the gaps by examining PBL

in kindergarten using a qualitative approach.

I aimed to address the local problem by using PAR in an attempt to involve the

kindergarten teacher and her students to find a way to use the second half of the school

day to implement PBL and develop 21st century skills. An additional intention of this

study is to contribute information to close to the gap in the literature involving

kindergarten and PBL. The methods used in this study will be discussed in detail in

section 2.

Review of the Literature

Journals from Sage and EBSCOHost were reviewed using various databases

including Academic Search Premier, Education Research Complete, Educational

Resource Information Center (ERIC), and Teacher Reference Center. Searches were

conducted using key words and phrases including *problem based learning*, *21st century*

skills, *full day kindergarten*, *constructivism*, *learning environment*, and *instructional methods*. The databases and search term used helped to narrow the study specifically to address the gap in the literature concerning PBL methods and kindergarten students.

Constructivism

The theoretical framework for this study is rooted in constructivism. Theorists including Bransford, Bruner, Dewey, and Piaget have contributed to the literature reviewed for this study. Constructivist theorists believed that students construct their own knowledge as they perceive the world and make their own meaning from those perceptions and experiences (Yuen & Hau, 2006). Knowledge is not acquired by teachers transferring information to students; rather students are active participants in solving problems using their own viewpoints (Syh-Jong, 2008; Yuen & Hau, 2006). Students construct their own knowledge by interacting with the environment (Harlow, Cummings, & Aberasturi, 2006; Kim, 2005; Li, 2006). As the student takes on an active role, the teacher's position changes also (White-Clark, DiCarlo, & Gilchriest, 2008). Constructivist teaching practices require the teacher to set up a learning environment that allows for the facilitation of active learning experiences while working harder and concentrating more than a teacher that uses traditional methods (Cohen, 1988 as cited by Gordon, 2009).

Origins

PBL traces back to Dewey's (1938/1997) work that focuses on learning by doing. Originally, Barrows from McMaster University's medical school developed a model for PBL (Goodnough, 2006; Loyens, Magda, & Rikers, 2008). Barrows' model was student-centered, involved small group work, used problems as themes, and promoted problem

solving skills (Goodnough, 2006). PBL encourages students to work to find solutions to problems that do not have just one correct answer. Collaborative groups of learners, like Barrows' medical students, work to identify what they need to learn in order to uncover a possible solution to the problem (Goodnough, 2006; Hmelo-Silver, 2004).

Students in a PBL environment learn to reflect on their experiences as they develop strategies and construct new knowledge. Because kindergarten is a place of experiential learning, the implementation of PBL as it encourages experiencing learning and investigation appears to be practical method of teaching and learning in this setting (Gullo, 2006; Torp & Sage, 1998). In order to meet the content standards in early childhood classrooms, methods other than the traditional learning approach are being considered to reach the many diverse young learners (Beneke & Ostrosky, 2009).

Kindergarten

Kindergarten is the grade that closes the gap between early childhood education and elementary education. According to Gullo (2006), "It is a place of nostalgic memory and powerful ritual imagery, as well as curriculum foundations for later school success (p. 4). The kindergarten curriculum years ago consisted of themes like community, family, transportation, and animals (Gullo, 2006). These topics were covered because children at the kindergarten age already had some exposure and could build off of their prior knowledge. Eliciting students' prior knowledge is emphasized when using a constructivist approach to learning (Calik, 2008). The kindergarten of today still includes similar topics and continues to elicit prior knowledge; however, it covers so much more as a means of preparing children for first grade. Gullo (2006) stated "kindergarten is

being redefined in terms of its ability to set up children's academic success at the next level" (p. 6).

In planning for first grade, kindergarten teachers develop and implement a curriculum that allows for great growth and development as a learner and a thinker. Kindergarten encompasses aspects of early childhood and elementary education to make for a smooth transition. Children at this grade level learn by experiencing their world through "playful learning and meaningful play" (Gullo, 2006, p. 7; Stuber, 2007). Kindergarten addresses both social and academic progress while meeting the needs of students as a group and as individuals. In many ways the contents of PBL appear to be an advantageous choice of curriculum for kindergarten.

An Instructional Model

There are several components of PBL that make it an effective teaching and learning method in kindergarten. The first being that the kindergarten students become part of the ill-structured problem they are challenged to find solutions for (Torp & Sage, 1998). Kindergarten students require an environment that allows for active participation. PBL offers students a collaborative learning environment which is where students make meaning of what they are learning (Hmelo-Silver, Chernobilsky, & Jordan, 2008). Both the teacher and the children are involved in the learning process (Gullo, 2006; McCombs, Daniels, & Perry, 2008). The teacher designs the problem and creates the structure and expectations for the learning process while the students work together in small groups and self direct several activities to solve the problem (Blaise & Elsden-Clifton, 2007; Land & Hannafin, 2000 as cited by Dalsgaard & Godsk, 2007; Duncan, Lyons, & Al-Nakeeb, 2007; Pepper, 2009; Yeo, 2008). Dewey (1938/1997) stressed the importance of

children experiencing learning by being enthralled in the process. In kindergarten, children learn first through their experiences as they see and touch new objects, hear language, and hear new sounds (Gullo, 2006). By allowing the children to become a part of the problem they will be working to solve, an environment that encourages active participation and experiential learning is created.

Another critical component of PBL is that the problem incorporates the interests of the learners, which according to Dewey (1938/1997), makes the child the center of the school. Gullo (2006) stated that the classic kindergarten curriculum is child-centered and highly social in nature. Not only are the children actively engaged in their learning, but also the learning revolves around their needs and interests. Teachers in a PBL classroom design problems based on their own reflections of student ideas and conversations (Galizio, Stoll, & Hutchins, 2009). When student interests are included in the creation of the problem, meaning is linked to the tasks along with a likely increase in attention and motivation (Maclellan, 2008).

Along with incorporating student interests in a PBL curriculum, it is important to make the problems relevant to the young learners. A study was conducted in a school in Greece that involved interviewing middle school aged history students regarding their interest and content (Mitsoni, 2006). The participants in this study revealed that the content became relevant as it related to their everyday lives and allowed for active learning (Mitsoni, 2006). Similar to the study in Greece, the question posed in kindergarten PBL classroom should be situated in a real-life context allowing the learners to relate to the material. According to Pritchard (2007), students should have a voice in what they would like to learn about; therefore the students should have a choice in how

they would like to solve the problem. When choice is incorporated into the learning process, motivation increases (Katz & Assor, 2007). Because the problem is student-derived, the content becomes relevant and meaningful to the learners (Pritchard, 2007). Constructivist theorists including Dewey, Bruner, and Vygotsky contend that knowledge is best constructed using a learner-centered approach accounting for individual interest and experience (Lambert et al., 2002). Incorporating the students' interests and exploring relevant issues in an open classroom atmosphere will help the learner feel comfortable as they begin to take ownership in their own learning.

Students learning in a PBL setting tend to learn in a low stress level environment and are able to learn for meaning and understanding (Albanese & Mitchell, 1993; Vernon & Blake, 1993 as cited by Hall, 2006). According to Gullo (2006), kindergartners that experience drill-orientated instruction tend to express low self-confidence and are less advanced in social and language skills by the end of the school year. Kindergarten students benefit from learning in a stress free environment because they experience education in a positive way and one that invites them to be active participants in learning. As the students become engaged, they dive deeper into the problem and make a personal investment in finding a solution (Torp & Sage, 1998).

Actively engaged students in PBL classrooms complete a variety of tasks that increase their overall motivation and enthusiasm towards learning (Stefanou & Parks, 2003). The tasks are relevant and at times cocreated by the students to encourage them to take ownership in their learning. Garcia-Ruiz (2009) shared an example of a lesson about gardening and explained that her students felt privileged and important as they worked as engaged learners on their gardens. Their enthusiasm for their work stemmed from the

relevant lesson that allowed them to take ownership for their learning. According to Dewey (1938/1997), students learn best when they are engaged in relevant tasks designed with opportunities to construct their own meaning. Student involvement, diverse activities, challenging tasks, and group work are strategies used in a PBL classroom to create a positive educational atmosphere where all students are successful. Treating students as partners in the teaching and learning process enhances student learning and motivation (McCombs, Daniels, & Perry, 2008).

Kindergarten students learning in a PBL environment are absorbed in activities that help to improve their thinking skills. As the children begin investigating and gathering information to find all of the pieces of the puzzle they uncover new information, new questions arise, and further exploration is required (Torp & Sage, 1998). Roh (2003) stated that learning begins with a problem and students need to gain new knowledge before they can solve it. Through the use of higher order thinking skills such as analysis, evaluation, and synthesis, the learners begin to gain a clear understanding of the problem and develop a direction they would like to take it in to reach their destination (Torp & Sage, 1998).

Developing higher order thinking skills is important at the kindergarten level as the students begin to probe beyond simple answers and begin to ask, why? As long as the problem is age level appropriate, young learners can pursue information by asking questions, through observation, and experimentation (Torp & Sage, 1998). When students begin to ask questions, they are demonstrating that they are thinking about the content and linking it to what they already know (Chin & Osborne, 2008).

Along with being suitable at the kindergarten level, the problem should be meaningful and expand the learners' understanding. For example, Ogu and Schmidt (2009) described a kindergarten classroom that expressed an interest in rocks. They began to observe rocks using magnifying glasses and they began to ask each other questions as they worked to build their understanding and make meaningful connections (Ogu & Schmidt, 2009). The students are exposed to new concepts and develop a rich vocabulary about the content as they work to solve the problem (Pennell & Miles, 2009). The teacher introduced open ended questions that did not require one correct response rather responses that encouraged discussion, further inquiry, and the development and application of a descriptive rock vocabulary (Loertscher, 2007; Ogu & Schmidt, 2009). The problems used in PBL require learners to consider several options and then negotiate with other students to find the best possible solution (Chin & Chia, 2008; Hmelo-Silver & Barrows, 2008). The students in this kindergarten class learned to answer more complex questions about rocks because they were interested in the topic and learned in an environment that promoted exploration, inquiry, and collaboration.

Integrated Curriculum

Learning theorist, Dewey (1938/1997), believed that learning should focus on problems that are relevant to young people and the subject matter should increase understanding and problem-solving skills (Nesin & Lounsbury, 1999). With this in mind, Dewey developed integrated curriculum to give learners the opportunity to make direct connections between different subject areas (Davis, 1999). The idea focused on having students explore a topic in depth using a hands-on, experiential approach to learning (Nesin & Lousbury, 1999). Students in a PBL setting would benefit from the use of an

integrated curriculum, which allows for student involvement in planning, investigating, exploring, researching, decision-making, and problem solving. The curriculum would be situated around the problem and designed to motivate the learners through discovery. Students would not be required to stop to change subjects, rather they would move through the school day working in all subject areas as they collaborated to find a solution to the problem (Davis, 1999). Used effectively, integrated curriculum will play an important role in engaging and motivating the learners.

Multiple Intelligences

Along with integrated curriculum, kindergarten teachers in a PBL environment can implement Gardner's Multiple Intelligences into their lessons. Gardner (1995) stressed that all children possess distinct intelligence to help them learn and that they should be allowed to utilize their strongest intelligence when problem-solving. When individual learning styles and preferences are identified, the teacher can incorporate tasks that involve the multiple intelligences and give the students the opportunity to choose how they would like to learn the material. When students are involved in the decision-making process they begin to take ownership of their learning which increases motivation and their overall commitment to finding a solution (Gardner, 1995). Blythe and Gardner (1990) showed using multiple intelligences as an approach focused on children's diverse learning styles. This strategy promoted hands-on and life-relevant learning activities. Multiple Intelligence strategies captivated the students and assisted them in becoming active and engaged learners (Gardner, 1995).

Gardner's (1995) showed that student motivation and subject matter comprehension is improved when using the multiple intelligence strategies to educate

students. The focus of the approach should remain on the skills needed to help reach individuals' learning style preferences while adding relevance to the curriculum (Tomlinson & Kalbfleisch, 1998). When teachers remember all kindergartners do not learn the same way, they can make every attempt to create lessons utilizing various learning styles and increase their students' chances for success.

In order to reach all students, teachers in PBL classrooms use a variety of instructional techniques. Students learn which styles they favor and enhance their social skills (Tarhan & Acar, 2007; Tarhan, Ayar-Kayali, Urek, & Acar, 2008). As team members, students are interacting to help each other learn. Piaget and Vygotsky considered the importance of interaction with peers to be significant in improving social and cognitive development (Gullo, 2006; Piaget, 1964). As the children learn together, they begin to hear other student's perspectives. Listening to the ideas of their peers causes the learners to rethink their own positions. These interactions help students to reach higher levels of understanding as they evaluate and refine their own thoughts.

Learning How to Learn

Students learning in a PBL setting are challenged to develop higher order thinking skills and encouraged to learn how to learn (Torp & Sage, 1998). Not only do the learners gain new knowledge and build off of their existing knowledge, but they also discover strategies for how to learn. PBL incorporates information gathering, discussing data, making predictions, and decision-making (Torp & Sage, 1998). Instead of simply learning about different types of community helpers, for example, the kindergarten students also learn how to find information about community helpers. They are taught to

learn using several approaches including researching, interviewing professionals, and observing community workers.

According to Bransford (1979), children can be taught strategies that will help improve their overall performance. The idea is to teach children learning strategies and then guide them in transferring that knowledge into new learning situations. The use of their strategies will become a natural process and the students will begin to self-regulate their learning activities (Bransford, 1979). Pelco and Reed-Victor (2007) showed that children develop the ability to self-regulate their behaviors, emotions, and learning at a very young age. Children between the ages of 4 and 6 are at a crucial phase in the development of self-regulating behaviors (Perels, Merget-Kullmann, Wende, Schmitz, & Buchbinder, 2009). Once children become self-regulated learners, they are able to self-monitor to identify what they know and what they need to know to solve the problem (Sorić & Palekčić, 2009; van Den Hurk, 2006). At the kindergarten level, students will require prompting to invite them to call upon their strategies as they work to solve their problem. Student achievement and motivation are linked to self-regulated learning (Usher & Pajares, 2008; Zimmerman, 2008).

As students learn how to learn they become more aware of the concept that the process is more important than the product (Bruner, 1966). Problem based curricula are designed around the learning process rather than the actual content (Schiller, 2009). Students work to solve one problem and uncover other problems that need to be solved first. The sequence of discovering the solution is just as important as the actual solution. According to Bruner (1966), we teach subjects to prompt children to think and take part in the process of gaining new knowledge. In a PBL environment, children seek a solution

and in the process acquire knowledge about learning and the subject matter simultaneously.

Learning theorists like Dewey, Bruner, Vygotsky, and Bransford support the PBL method. By using an integrated curriculum and by implementing Gardner's multiple intelligences, PBL can be used as an effective process at the kindergarten level. According to Gullo (2006), "Kindergarten students are mature enough to participate in discussions about classroom problems, and they can help generate ideas about possible solutions" (p. 53). If teachers draw upon the students' natural instinct to investigate, the kindergarten students can be guided through learning using a problem solving technique (Akçay, 2009). Kindergartners in a PBL environment would have the opportunity to make improvements in the development of higher order thinking skills, collaboration skills, problem solving skills, and comprehension.

21st Century Learning

Along with learning how to learn, 21st century learning is also essential in preparing students for life beyond their education and into the workplace. This type of learning involves social aspects as well as experiential and collaborative styles of learning (Trilling & Fadel, 2009). Acquiring 21st century learning skills is crucial for students as education transforms to meet the needs of a fast paced, technology driven world (Trilling & Fadel, 2009).

Students today are learning in what is considered to be the knowledge age (Trilling & Fadel, 2009). After completing college, graduates will be expected to contribute to society by carrying forward the skills learned in school (Trilling & Fadel, 2009). In order to be successful in the workplace, various opportunities need to be

afforded to learners during their education. Rich classroom environments with unique

teaching and learning styles can contribute to energizing students by heightening their

desire to learn (Rich, 2010). Teachers can prepare students for the responsibility and

willingness to do well in the field of their choice and expertise. Making students aware of

what they will be learning and why it is important can allow students to feel

responsibility for what they are learning (Zmuda, 2009). Making expectations clear and

sharing ownership of learning with students can also aid in the preparation of what is to

come after school (Zmuda, 2009). Teachers can also facilitate opportunities for students

to gradually increase their amount of responsibility and in doing so teach lessons on how

to make good choices as they would after the school years (Kaufeldt, 2010).

   In order to internalize and make meaning of what is being taught, students need to

experience their learning. Teachers can guide their students through activities that help

them to develop socially while gaining a deep understanding of the content (Kaufeldt,

2010). When lessons are relevant, the students tend to care more about learning the

content (Trilling & Fadel, 2009). Meaningful lessons also tend to spark creativity and

allow for different individual strengths to shine through (Trilling & Fadel, 2009). Along

with being meaningful, lessons that let learners make an emotional connection are more

likely to be internalized. Students remember events that involve doing and connecting on

an emotional level (Kaufeldt, 2010). When students feel that the tasks are worth doing,

they are more inclined to participate. Lessons that involve drilling and memorizing are

not as meaningful whereas experiential learning promotes understanding and

participation (Kaufeldt, 2010). Instead of memorizing, students need to be learning

innovative skills and life skills (Trilling & Fadel, 2009). Jobs available to college

graduates often involve problem solving, communicating, and higher order thinking, rather than procedural and repetitive jobs (Trilling & Fadel, 2009).

Successful learning occurs when high quality teaching takes place and high quality learning opportunities are provided (Loertscher, 2009). 21st century learning occurs when students are allowed to work with each other and use tools and technology as they would in the workplace (Helm, Turckes, & Hinton, 2010; Loertscher, 2009). Problem solving teams are becoming increasingly popular in the workplace. Fewer companies have individuals creating and developing new ideas (Trilling & Fadel, 2009). In order to prepare learners for the workplace, the gap between schools and businesses needs to be addressed. Classrooms can transform to accommodate the 21st century learner by having work samples on display, areas and tools for presentations, and furniture and set up conducive to group work (Helm, Turckes, & Hinton, 2010). Interactions with students should change and grow as communication skills strengthen through discussion, team work, and presentations. Instruction in schools needs to match interactions for what is expected outside of school. Collaborating with experts and those in the business field can help schools make the necessary transformation and begin to bridge the gap between the two (Christen, 2009). Teachers can help to close the gap by teaching students to use multiple resources, multitask, work with technology, make good decisions, and become lifelong learners (Kuhlthau & Maniotes, 2010).

Emerging Themes

After reading the available research on PBL, I have found several common themes. The first is that the foundations of PBL are rooted in the ideas of the constructivist theory. Dewey and Piaget argued that learners construct their own

knowledge and that cognitive change takes place when learning (Torp & Sage, 1998).

Many features of the constructivist theory are incorporated in PBL including cooperative

learning, thinking, problem solving, meaning making, and communication skills (Torp &

Sage, 1998). PBL is an effective process when these key features are included to help

students achieve.

Another common theme in the research is the idea that learners build off of their

prior knowledge. Children in a PBL environment or constructivist learning environment

are viewed as beings with existing knowledge and experiences that can be activated and

supplemented. Before attempting to solve a problem, learners must share what they

already know about the topic to activate their prior knowledge. According to Bransford

(1979), learners need to utilize their previously acquired knowledge in order to guide

what they need to look for when solving a problem. The constructivist theorists also

agree that learning occurs in a certain sequence that allows the student to recognize

existing knowledge, identify what new knowledge is needed, and transfer their

knowledge to new situations (Pritchard, 2007).

Along with the activation of prior knowledge, learners in a PBL environment

experience learning using a hands-on approach. Dewey (1938/1997) believed in a

necessary relationship between education and experience. The constructivist learning

theory states that learning is an experiential process that requires students to collaborate

and become engaged in their learning. In order to gain a deep understanding of the

content, learners are actively engaged and feel a sense of ownership in their own learning

(Helm, 2008). Experiencing learning is a common thread among many of the learning

theorists that support the PBL method.

Methodologies

Many of the studies conducted on PBL in this literature review used qualitative methods. None of the studies reviewed were conducted in early elementary or primary classrooms. In an evaluative case study of sixth grade students, Simons, Klein, and Brush (2004) used student attitude surveys, posttests, interviews, and observations. The findings from this study indicate that with effective implementation of PBL, sixth grade learners can experience academic achievement (Simons et al., 2004).

Tan (2004) used interviews and case vignettes to capture qualitative information from 100 students in biotechnology, chemical engineering, computer engineering, electronics, marketing, logistics and operations courses. Tan found that PBL is an effective method of teaching and learning only if it is implemented correctly and problems are designed carefully and well.

Gijbels, van de Watering, and Dochy (2005) conducted a qualitative study using questionnaires and semi structured interviews with law students. The findings for this study show teachers and students appreciating and understanding task assessments in PBL environments (Gijbels, van de Watering, & Dochy, 2005). Focus groups were used in a study by Herron and Major (2004) with community college leaders. This study was triangulated with self-reflections, group evaluations, and researcher field notes (Herron & Major, 2004). The findings in this study specify that PBL is an effective method of instruction that encourages collaboration, research skills, and knowledge of leadership (Herron & Major, 2004). Sungar and Tekkaya (2006) completed a quasi-experimental design study using questionnaires and two multivariate analyses of variance with high school students. Results from this study showed that participants in the PBL classroom

gained higher levels of self-regulation, critical thinking, and collaborating skills compared to those in a traditional classroom (Sungar & Tekkaya, 2006).

Implications

Based on this literature review and results from data collection and analysis a curriculum will be developed as a final project that will be based on the tenets of PBL and will encourage 21st century learning in this kindergarten classroom. Results of this project study may be used by kindergarten teachers to be implemented in full day classrooms and by other researchers at the kindergarten level as a challenge to develop their own interdisciplinary full day kindergarten curriculum. In an effort to best prepare kindergarten students for the elementary grades, a PBL approach can be piloted in all subject areas. Early childhood programs may also benefit from the implementation of PBL techniques as more children are now beginning their education before they attend kindergarten.

This study will address social change within the Evelyn School District and beyond by exposing the teachers and students to a new way of learning and acquiring a set of skills that will benefit their lives in the classroom, the workplace, and the community. Learning different methods of instruction can help to prepare learners for the following grade levels and for the 21st century workplace. Several universities in the United States are beginning to make changes with the 21st century skills in mind as they alter their course design from teacher-centered to student-centered and encourage active learning (Machemer & Crawford, 2007). The skills being focused on in PBL environments train the students for how to be successful when working in collaborative situations in schools and in their chosen line of work.

An important goal of this project study was to create change in the participating teacher's classroom, in the school building, in the school district, in the community of Evelyn, and in the lives of the learners. This change can take place as traditional learning transforms into investigative inquiry and as students transform into stakeholders and owners of their learning (Torp & Sage, 1998). The American Psychological Association issued a set of learner centered principals to guide the necessary changes in education (Schoen & Fusarelli, 2008). These principles stress the importance of having high-quality learning environments that promote engagement, student interactions, problem solving, and students constructing their own meaning (Schoen & Fusarelli, 2008). This project study aims to create a high-quality learning environment where kindergartners develop life-long learning skills.

Summary

I aimed to fulfill the full day kindergarten curriculum in the Evelyn School District with the implementation of PBL in the second half of the school day. By engaging the learners and creating stimulating educational experiences, the teachers will be better preparing the students to be problem solvers and global thinkers. This study was being conducted in an attempt to encourage decision making and creative thinking in hopes of raising achievement scores and increasing student motivation. A full day kindergarten program using PBL creates an education that addresses student learning needs and gains success.

Section 2 of this study is an outline of the methodology for this research including the design, data collection methods, participants, and data analysis. Section 3 is a description of the project in detail as well as the goals of the project and how it will be

implemented. This section will also include an examination of the available literature and how it addresses the project. Section 4 includes a reflection and discusses the value of this research.

Section 2: The Methodology

The vision for an effective school has changed to include learning communities of teachers and students creating, sharing, and mastering knowledge together (Carroll, 2005). This new vision is accompanied by new standards for 21st century learners (Pappas, 2009). In order to help the Evelyn School District transition from a half day to a full day kindergarten program in which 21st century learning opportunities were given, a qualitative study was conducted to explore the ways in which PBL activities could foster the 21st century learning skills of problem solving, communication, decision making, and collaboration.

Using a qualitative participatory action research framework, data were collected from a kindergarten teacher and her kindergarten classroom using observations and interviewing techniques. I acted as a learner participant during certain lessons and used classroom level observations during other lessons to better understand students' perceptions of the lessons. The teacher was interviewed in order to understand her experiences with using PBL and the meaning of those experiences. Interviews, according to Hatch (2002), are used to uncover the ways in which participants make sense of their world through their own experiences and hence can reveal information that would otherwise be hidden during an observation. Thus the use of both observation and interview techniques along with reflective notes gathered from the teacher and I as well as notes taken during researcher-teacher planning added to the trustworthiness of the study and provided a rich source of evidence from which to inform the direction of a project.

Qualitative Design

A qualitative approach was used within a participatory action research framework to determine the ways in which 21st century learning skills such as problem solving, decision making, collaborating, and communicating, could be developed by kindergarten students in a PBL environment. Data, collected using observations of students, interviews with the teacher, notes from researcher-teacher discussion sessions, and teacher and researcher reflections were analyzed using content analysis (Stemler, 1990) in order to understand how the PBL classroom activities were promoting 21st century learning skills in kindergarten students. Ongoing analysis of data was used to design subsequent classroom activities and this process of creation, observation, analysis, and reflection continued throughout the study. According to Creswell (2003), "meanings are constructed by human beings as they engage with the world they are interpreting (p.9)." The kindergartners and their teacher experienced a transition in the curriculum as they moved from a traditional learning environment to a PBL environment, therefore their meanings and interpretations of what it means to teach and learn changed. The instructional methods were altered as the teacher shifted into a facilitator role and the design of the lessons became centered on student inquiry (Spronken-Smith & Harland, 2009). These alterations and the ways in which the teacher facilitated them, were captured during data collection.

PBL activities are rooted in constructivism and for that reason I was actively involved in the learning processes under study in order to both understand these processes from the students and teacher's perspective and to interpret the outcomes observed. A PAR framework was used as PAR lends itself to the collaborative type of

research that is fueled by the needs of the participants and stakeholders (Dymond et al., 2006). For this study, the goal was to extend the kindergarteners' school day with lessons that provided opportunities for learning content as well as 21st century learning skills. Participatory action research allowed the teacher and the students to collaborate with me, which added validity to the study's findings (Bruyere, 1993; Meyer, Park, Grenot-Scheyer, Schwartz, & Harry, 1998 as cited by Dymond et al., 2006; Wolf, 1978).

Previous studies have been conducted that implement and evaluate PBL at higher levels of education and in various fields; however, this study addressed PBL lessons used with kindergarten students - a previously unstudied population. An exploratory qualitative approach was chosen due to this lack of prior research using PBL with the kindergarten population. Since a gap in the literature existed, a qualitative approach to examine and begin to understand how PBL activities can foster student outcomes was needed (Creswell, 2003).

I did not aim to implement or evaluate an existing curriculum, rather to create and explore if and how 21st century learning opportunities can be afforded to young children in a PBL setting – a study for which quantitative methods are not always appropriate. Rather a qualitative approach allowed me to explore participants' perspectives and determine the meaning they have established from their experiences (Creswell, 2003). By participating in the learning activities, I was able to observe and understand the participants' behaviors. Other possible qualitative techniques were considered and rejected. Instead of studying the practices of an already existing culture-sharing group as it is done in an ethnographic study, the purpose of this research focused on one group of kindergarten learners and their teacher as they re-negotiated their classroom environment,

hence PAR was chosen over this approach (Creswell, 2003). Rather than only telling the stories of the kindergarten teacher's individual experiences as it is done in narrative research, this research encompassed the teacher's experiences along with that of the students' experiences while using the researcher as the main data collection tool (Creswell, 2007).

Participants

The participant in this study was a kindergarten teacher from the elementary school in the Evelyn School District. Each kindergarten class had 25 students during the 2010-2011academic year. All of the kindergarten teachers in the district met monthly last year to share ideas, express concerns, and participate in a discussion group after reading a book about different teaching techniques. The kindergarten teacher that participated in this study shared some concerns and frustrations about her classroom management, the current curriculum, and her own style of teaching and seemed eager and motivated to create change in her classroom. I shared her own research on PBL and her idea for the project study with the team of kindergarten teachers. At this team meeting, this kindergarten teacher volunteered to participate.

Permission was granted from the principal of the elementary school in the Evelyn school district to conduct the study and the teacher gave informed consent to participate. The teacher was made aware that interviews were being recorded and transcribed. I did not use any participant's name or any information that could identify the teacher or her students in the reports and transcriptions. A supportive, respectful relationship was established between the teacher and I to reassure the teacher that she would be represented by an accurate reflection of what she said and did during the study (Creswell,

2007). Her voice is represented through interview responses, in observation transcriptions, and in the reflective writing in her journal.

Before the study began, I met the kindergarten students to introduce myself and explain my presence in the classroom for the study period. Throughout the 7 weeks, I made the children more comfortable with my presence in their classroom as I learned their names, classroom routines, and became a familiar face.

The study took place during my second year working at the elementary school in the Evelyn school district. Previous to working at here, I taught kindergarten at a primary school in the district for 5 years and developed a professional relationship with the kindergarten teacher participating in this study during that time. The relationships between the teacher and I contributed to the study as both are comfortable working together and had a shared understanding of the curriculum currently in place.

Data Collection

I collected classroom level observations from students engaged in learning activities as well as open ended interviews with the classroom teacher in order to obtain detailed views about that learning (Creswell, 2007). The classroom teacher and I collaborated to write up lesson plans for PBL activities weekly. Notes taken during these interactions as well as individual reflections, written separately by the teacher and researcher seven times over the length of the study, were analyzed and added to the data pool. As data were collected, they were analyzed and used to make decisions concerning the necessary changes to the next lesson in order to meet the needs of the kindergarten students. Data were collected and analyzed in order to understand the ways in which the

lessons were facilitating the 21st century learning skills. Hence several PBL units evolved

during these PAR cycles.

      I visited the kindergarten classroom twice a week to conduct 30 minute

observations. Each week one observation was a participant observation in which I acted

as a learner participant in the classroom (Hatch, 2002). This type of observation allowed

me to see the world through the eyes of the participants and understand the student

perspectives (Hatch, 2002). During each of these participant observations, I recorded

what the teacher and students said and did in an observation log notebook. A sample

observation log notebook is included in Appendix B. I began the observations by

scanning the classroom and taking field notes on the overall lesson and student behaviors

and then narrowed in on particular conversations and events (Mills, 2003). Decisions for

the focus of these observations were based on analysis of previous data. I logged specific

teacher and student quotes as well as actions and behaviors. The specific purpose of these

types of observations was for me to be able to experience and capture what was taking

place in the classroom from the participant point of view.

      I also took on a passive observer role in the second bi-weekly observation, where

field notes were recorded on a predesigned observation protocol using a word processor.

The observation protocol used during these observations was created using the constructs

under study which include collaboration, communication, decision making, and problem

solving. I noted any evidence of the development of these skills during classroom level

observations and the mechanism that prompted their development. The field notes

collected during these observations recorded using a three column table (see Appendix

C). In the left column, notes to self, I recorded thoughts, reflections, and distractions as

they pertained to the four constructs under study during the observation (Janesick, 2004).

In the center column, teacher facilitation moves that prompted student learning were

recorded. In the right column, observations, I recorded evidence of the development of

the specific 21st century learning skills including specific quotes, conversations, and

behaviors (Janesick, 2004). Data collected in the form of field notes during observations

were converted to research protocols by a process of filling in and adding to the original

notes using Microsoft Word Processor (Hatch, 2002). The research protocols were then

analyzed following each of the classroom visits.

When interviews are used along with observations, the researcher gains access to

deeper participant perspectives (Hatch, 2002). In this study, open ended semi structured

interviews with the kindergarten teacher were conducted along with the weekly

classroom level observations. During these formal interviews key phrases were noted and

details were filled in at the conclusion of each interview using playback of the recording

of the interview (Hatch, 2002).

Both the classroom teacher and I kept reflective journals as a written record of

their experiences and thoughts during the 6 weeks of the study (Hatch, 2002). These

journals were reviewed throughout the study and used to triangulate the findings from the

observations and interviews. This type of data collection allowed the classroom teacher

and I freedom to record and express feelings, ideas, insights, and concerns. Journal

entries were completed and collected once a week (Hatch, 2002).

In order to set the context for the analysis and findings sections, a brief

description of the two open-ended problems and subsequent activities used to facilitate

the PBL activities with the kindergarten class over a 7 week period are given. The first

problem, included in Appendix D, focused on nocturnal animals and included PBL

activities that allowed the students opportunities to learn about animals that are out at

night, what they eat, where they live, what they look like, what they smell like, sounds

they make, and other unique characteristics. This unit also branched off to include topics

such as night and day, telling time to the hour, and the five senses. The second open-

ended problem was divided into two parts and related to the Thanksgiving story, included

in Appendix D, and focused on friendships and relationships. This unit included content

about the pilgrims and Native Americans as well as building friendships within a

classroom and making new students feel welcomed. The PBL activities were planned by

the teacher and I based on the direction that the learning took and the interests of the

students. Anchor charts, charts created by the teacher and filled in with the students'

thoughts, were used to guide learning and provide reminders of the expected learning

behaviors for the children.

Data Analysis

The PAR approach requires collaborative decision-making regarding the direction

of the lessons (Savin-Baden & Wimpenny, 2007). After each iteration of data was

collected and analyzed, the teacher and I then discussed ways in which PBL activities

were allowing students to participate in 21st century learning and subsequent lesson

activities were created based on these discussions. For example, during the early lessons

of the first unit that focused on nocturnal animals, the teacher recorded in her journal that

she felt rushed during the lessons. When the teacher was asked about what she would do

differently during an interview on October 12, 2010 she responded by saying

I would move a little more slowly. I would've introduced the problem and maybe just talked about the problem instead of even introducing the anchor charts. I just think I tried to take on too much the first couple of days and so to help that out I am going to go back and review a little and almost kind of re-step the phases we've gone through so far.

During the peer debriefing session held on October 21, 2010, the discussion centered on the need to slow down and allow more time for each activity to be completed for each lesson. Together the teacher and I made decisions regarding the lessons based on the data collected and designed the lessons to help the teacher feel more comfortable and give her an adequate time frame to teach the lessons. Because the instruction was rushed and the teacher needed time to reflect and think about changes to implement, the students were missing quality instruction. During classroom level observations, it was noted that some students seemed bored or lost because they could not keep up with the teacher's fast pace. The data collected through discussions, observations, journal entries, and interviews revealed that it was necessary to review the time allotted for the lessons as time was a factor impacting the effective implementation of the lessons.

Observations and interviews were conducted weekly, journal entries were recorded and discussed, and the direction of the PBL lessons was modified according to the results of the ongoing analysis to meet the needs of the learners throughout the study. Results of data analysis were integrated throughout the study in order to inform the direction of the next observation and interview. For example, during an early classroom level observation I noted a lack of student engagement at key times during the activity. In an interview previous to this observation, the teacher had expressed a particular interest

in having the students working together but acknowledged that she herself had not focused enough on facilitating this. Based on this data, the teacher and researcher designed the following activities with an emphasis on facilitating student collaboration. These new directions for the lesson activities were monitored during subsequent observations and researcher reflections. It was noted that a student centered classroom culture began to emerge. The data collected informed the direction of the following observations as they focused on collaboration and engagement.

At the end of each week during the study, the open-ended comments regarding evidence of 21st century learning from observations and from teacher responses to interview questions were analyzed using content analysis. Recordings of open-ended interviews with the teacher were transcribed and filled in using a word processor (Hatch, 2002). The data were condensed and recorded onto index cards for sorting and grouping to help notice themes, patterns, and common characteristics. Letters and numbers were assigned to the cards to include the type of data collection process, the date, and the time of the data collection. For example, after conducting an interview with the teacher, specific quotes and interview responses were recorded on a card and labeled with (I, 10/01/10, 3:00). Sample index cards are included in Appendix E. This label shows that the data collected came from the interview (I) that took place on October 1, 2010 (10/01/10) at 3:00 (3:00). The same procedure was used to label observation notes (O) and journal entries (J). The cards were then sorted into the initial categories of collaboration, communication, problem solving, and decision making – those that represented the constructs of interest for this study. Evidence from the data collected was highlighted using a color code. The highlighted portions were printed and glued onto

index cards. The index cards were sorted into groups according to the color codes which represented the initial categories. As this process occurred, new sub categories clearly emerged across initial categories such as student motivation, change in the teacher's role, discovery learning and social skills. For instance, as cards were being sorted it became apparent that the teacher was using modeling in most lessons and facilitating small group learning rather than teaching using whole group instruction. The category for a change in the teacher's role became obvious during this sorting process.

During the coding and condensing processes, if a card did fit into a category or caused a discrepancy in the study, that piece of data was reviewed by the teacher I and resulted in a new category emerging to ensure that all data was accounted for. For example, the teacher communicated in an interview response that she noticed her students were struggling with taking turns being called on to share during whole group instruction (I, 10/26/10, 3:00). This piece of data did not fit into one of the already established themes or categories. In a later interview, the teacher made a statement about how she noticed that the PBL lessons were helping with life skills and teaching her students to get along (I, 11/10/10, 12:00). Through the coding and sorting processes, a new category, social skills, surfaced to incorporate these two pieces of data. This process of coding and reducing the data made it manageable for analysis (Mills, 2003). All collected data were analyzed to explore if and how the PBL lessons were affording opportunities for the 21st century learning skills of problem solving, communication, collaboration, and decision making in this kindergarten classroom.

Findings

The purpose of the study was to explore the ways in which PBL could be used in a kindergarten setting to promote opportunities for students to engage in 21st century learning skills. The constructs, collaboration, communication, problem solving, and decision making emerged from the literature review as particularly pertinent to this study and were used as initial categories in the study. Appendix F depicts evidence from observation data of opportunities for students to participate in 21st century skill development and the type of teacher facilitation that led to such development. Evidence of each of the four initial constructs appears as students learn in a PBL kindergarten classroom as the teacher transforms into a facilitator. Key points are included in Appendix F to show how decisions made by the facilitator assisted students in gaining 21st century skills as they learned to discover information and uncover possible solutions.

As teacher interviews, research, and teacher reflection data were analyzed along with re-analysis of observations, other student constructs began to surface such as student motivation as well as the ability to work with others and get along. For example, during a participant observation, I recorded that the students were sitting with their squads sharing books on nocturnal animals (O, 10/13/10, 1:15). I joined one of the squads and listened as they spoke to each other about what they were finding. Students were showing each other pictures from the book they were looking at and discussing the pictures that they saw. The students were sharing and trading books without arguing. I also noticed how motivated the students were to get their hands on a book and find information to share with their squad, with the teacher, with me, and with the whole class. Students were saying "I have a discovery!" and "Look at this!" Students were showing that they had

learned content about nocturnal animals by explaining the pictures in the books. Students were enthusiastically sharing by saying "These are vampire bats" and "I found a raccoon eating a peach." Later, the teacher expressed that her most memorable experience during the past seven weeks was "the day that we gave them books at their tables when we were doing nocturnal animals and they were looking at pictures and saying 'Look, here is a raccoon and he is getting something out of the garbage and it is nighttime.' I really thought that was cook (I, 11/18/10, 3:00)." The lesson on October 13th allowed for discovery and though this was only the second week of the study, the students were engaged and motivated to learn and share what they were learning.

In addition to the initial themes, I discovered PBL activities also gave students opportunities for discovery learning, social learning, the development of higher order thinking skills, and using 21st century skills in other parts of their school day. Findings also revealed that students became highly motivated and used multiple resources to solve problems. Appendix G gives a specific example of each of these themes as they emerged through analysis of observation field notes, peer debriefing notes, interviews with the teacher, and journal entries.

Appendix H provides a data trail and details when and from which data source these new themes emerged. Data including interview transcriptions, observation field notes, and journal entries was collected over a period of seven weeks and analyzed to find themes, sort information, and note frequencies. Themes occurring across multiple data sources were used to validate each other (Briggs & Coleman, 2007). As can be seen by the frequency of its occurrence, the most salient theme was the need for specific changes in the teacher's role. In light of these findings, a teacher resource guide to support the

teacher during this transition into a becoming a PBL facilitator has been created as an end project (to be discussed in Section 3).

Taken together the themes that emerged from this study and how they are presented in appendices G and H show how PBL lessons afford kindergarten students with opportunities to develop 21ˢᵗ century learning skills when the teacher assumes a new role in the classroom, there are many resources available to learn from, and when the appropriate amount of time is allotted to promote discovery learning. This change in the teacher's role was a critical factor in creating opportunities for the desired learning to occur. Throughout the study multiple data sources revealed the ways in which the teacher was continuously reshaping and defining her own role as she facilitated the PBL lessons. By the end of the study, the teacher's opinion of PBL in kindergarten changed as her and the students assumed new roles, creativity was sparked, and active learning took place. The key findings summarized above are detailed in the remainder of this section.

Collaboration

By facilitating small group work and modeling appropriate behaviors, the teacher was able to help her kindergarten students gain the collaboration skills needed for working together throughout the school day.

Before this study began, the teacher taught using traditional methods such as whole group instruction for the majority of the day, allowing little time for student interaction. At the beginning of this study, the teacher expressed that she would like to see her students working together more often (I, 10/01/10, 3:00). After one classroom observation and an interview with the teacher, the data collected guided the lessons that were created to include small group time and more opportunities for the students to speak

to each other. Because collaborative learning was new to the kindergarten students, I documented the need for modeling and practicing appropriate skills and behaviors (J, 10/06/10, 7:00). Data collected through teacher journal entries and further observations, showed that the students seemed restless and lost attention during long whole group learning sessions(J, 10/04/10, 3:00; O, 10/04/10, 1:15; O, 10/06/10, 1:15). The need for the students to work together was becoming very clear. Ongoing analysis of the data collected steered the following weeks' lessons to focus on student collaboration by including activities such as small group discussions, group chart making, and group presentations.

During the following weeks of the study, the teacher began to notice when the whole group instruction was not effective and would spontaneously change the style of learning into small group, collaborative learning (O, 11/08/10, 1:15). As I narrowed the focus to collaboration, another theme emerged. In order for the students to improve their collaboration skills, they needed to be afforded more learning experiences to work together. This called again for a change in the teacher's role. I had previously recorded that there was a need for a "release of power" in her reflective journal (J, 10/15/10, 3:00). After several conversations between the teacher and I, the teacher discovered that she was transitioning into a new role. The teacher empowered her students as investigators and transitioned into a supporting role as a guide. Different from a traditional style of teaching, PBL allowed the teacher to relinquish some of the control of the direction of the lesson and the ways in which information is obtained. The responsibilities of the teacher changed as she began to question and prompt her learners to strengthen their thinking skills rather than feed information and expect students to recall it later.

By the end of the study, the teacher observed her students working together, helping each other, and cooperating during different times of the day (I, 10/26/10, 3:00; I, 11/10/11, 12:00). The collaborative skills they were learning during the PBL lessons were being applied during their morning work time and literacy work stations. The observation of 21st century skills during other parts of the school day became another new theme that emerged during the data collection (I, 10/19/10, 3:00; I, 10/26/10, 3:00). Collaborative learning became an effective way for the students to learn and therefore became one of the ways in which the teacher allowed her students to work during all parts of the school day. During one of the final interviews, the teacher stressed how she had been using group work and learning stations in other parts of the day so that students could work together and use the resources in the classroom to solve problems together (I, 11/10/10, 12:00).

Communication

While facilitating how to communicate during PBL, the teacher experiences a shift in her roles. Constant modeling becomes a strategy she uses frequently to demonstrate the expected behaviors and skills, such as sharing ideas within a group, speaking properly and listening respectfully, to her students.

In the beginning of the study, the teacher mentioned that there were issues with tattling and getting along due to a lack of effective communication skills (I, 10/01/10, 3:00). The teacher also stated that she wanted her students to learn to speak properly during group discussions. During the first PBL unit, the communication skills being addressed by the teacher concentrated on the appropriate ways to share ideas with a group, take turns speaking, and listen respectfully. During the first classroom level

observation, I noted many students shouting out answers and making loud noises while the teacher or other children were speaking (O, 10/04/10, 1:15). Some students raised their hands to offer ideas and answers. Many students were talking to each other instead of listening to the teacher. I noted the importance of modeling effective communication.

During following observations, I noticed the teacher modeling how to raise her hand and wait to be called on (O, 10/06/10, 1:15). Some students continued to shout out answers throughout the lessons and the teacher continued to remind them to raise their hand. After several lessons with the teacher constantly modeling, I noticed one student looking at another child that was speaking (O, 10/13/10, 1:15). The teacher drew everyone's attention to the student modeling effective listening. Many students began looking at the speaker as well. Before starting the second unit, the teacher expressed that she expected her students' communication skills to improve (I, 10/26/10, 3:00). I noted that an important focus during the following unit needed to be modeling of effective speaking and listening (J, 10/28/10, 3:30).

Along with teacher modeling, an emphasis was placed on the proper way to speak during the second unit. Lessons were created with modeling respectful communication and proper speaking in mind. These lessons included whole group instruction with the teacher modeling the proper procedures for listening to students as they spoke and raising her hand as a reminder for students who wanted to share. These lessons also included small group discussions where the teacher would join small groups and point out correct behaviors and continue to model within the small group. Students worked in small groups more often and small group communication was modeled by a group of students before the lesson began. During an interview, the teacher shared that she noticed a difference in

her students' ability to communicate with each as they sat in circles and shared with one another (I, 11/02/10, 3:00). The teacher also noticed some students beginning to take charge and step into a leadership role during small group work time (I, 11/02/10, 3:00). Following lessons continued to focus on small group discussions after watching and practicing small group communication skills. Students continued to become leaders and take initiative during small group time. Despite the reminders and continuous modeling, the students seemed to struggle with looking at the person speaking as they communicated with each other throughout both units of study. Even though, the proper way to speak was modeled, the teacher rarely corrected improper grammar and sentence structure and the students did not appear to make gains towards strengthening this aspect of communicating.

By the end of the study a related theme emerged that revealed social skills being practiced and developed throughout the study. The teacher noted how she felt that her students were learning life skills and developing social skills (I, 11/10/10, 12:00). The social skills were developing as the teacher's role changed as she modeled, asked questions, and guided the students through problem solving conversations rather than simply redirecting students or disciplining behaviors. These student behaviors and teacher redirections were also noted under the problem solving construct. Learning how to solve a simple problem like how to communicate that a book was missing or that a student was sitting in the wrong spot on the carpet demonstrated evidence of problem solving at a very basic level but necessary at kindergarten level. Through the use of PBL, the students were taught to speak to each other respectfully, listen to each other, get

along, and resolve problems together. They developed social skills during the PBL units as they collaborated and communicated with one another.

Decision Making

While practicing communication skills and learning collaboratively, the students worked to find solutions to the problems posed during both units of study. As they worked, they learned to make decisions individually and as a small group.

Similarly to a traditional learning environment, in the beginning of the study the teacher asked guiding questions to help the learners make decisions. The class as a whole made decisions about what to include on charts and posters that reflected their learning. I noted that the learners were deciding what they wanted to share or include but were not sharing a reason for the answer they had given (O, 11/08/10, 1:15). Through analysis of this data, a focal point for following lessons was to have the teacher prompt the students to defend their solutions and their thinking in order to enhance their decision making and thinking skills.

During following lessons, the teacher asked the students more questions which led to the students asking more questions. These lessons included books read aloud by the teacher with stopping points for students to share and for the teacher to prompt with questions. During the read aloud, the students were also asked to turn to share their thinking with their group or with a partner and then several students were called on to share with the whole group. I noticed that the students were demonstrating their thinking during whole group and small group discussions by asking questions (O, 11/17/10, 1:15). An interview response from the teacher stated that the students were beginning to ask questions to show what they were thinking as they listened to books read aloud or looked

through different resources in their small groups (I, 10/19/10, 3:00). The classroom was shifting from a traditional learning environment into a place of inquiry, collaboration, and higher order thinking as the learners were demonstrating their understanding of the content.

By the end of the study, student questioning and collaborative thinking led to decision making as the learners worked together to choose reasonable possible solutions to the problems presented. Although their explanations for choosing their solutions were lacking, there was evidence of higher order thinking in recall, understanding, questioning, and decision making. At this point I added higher order thinking to the list of emerging themes. The application of these thinking skills led to students working together to eliminate and narrow the list of possible solutions as they tried to solve to the problem.

Problem Solving

This section illustrates how collaborating, building effective communication skills, and decision making led to finding possible, reasonable solutions to problems posed to kindergarten learners through discovery while developing social learning skills.

In the beginning of this study, the students were posed with the first problem and guided through the process of sharing what they knew about the topic, their questions, and how to find possible solutions (sample problem statement: See Appendix J). Observations conducted during the first unit showed students completing activities in the classroom and in the computer lab. The students were sifting though many resources, listing possible solutions, ruling out solutions that no longer made sense, and linking their learning to the problem presented at the beginning of the unit. Students continuously used problem solving skills to name, defend, and collectively determine the best possible

solution. Student problem solving was prompted and supported by the teacher and the many different resources that were made available about the content. Initial interview responses from the teacher expressed how she wanted her students to experience learning and problem solving with excitement as they learned new things using meaningful content (I, 10/01/10, 3:00). Along with learning the content, the students also needed to learn how to work together without having arguments and relying on the teacher to solve their problems.

During the following weeks an emphasis was placed on having multiple resources and increasing student excitement. At this point, teacher's interview responses expressed the realization of the importance of having multiple resources for problem solving and observations noted that students were eager to participate and motivated to learn new information (I, 10/26/10, 3:00; O, 10/13/10, 1:15, O, 10/20/10, 1:15). Field notes recorded during observations noted student excitement and motivation as they learned from the dozens of books borrowed from the public library, the visit to the school library, and the activities completed in the computer lab (O, 10/13/10, 1:15; O 10/20/10, 1:15). I focused on having resources and student excitement, a new theme emerged of discovery learning. As the students learned to use books, the computer, and each other as resources, the teacher and researcher noticed the students discovering the content information on their own and within their small groups. As discovery learning increased, the teacher noticed a shift in her own role as she was now teaching her learners how to use resources rather than simply teaching the content.

At the conclusion of both units, the classroom walls were filled with anchor charts and student illustrated posters. Fewer arguments and disagreements occurred as students

developed social skills and learned to solve their problems without relying on the teacher. During the final interview, the teacher shared that the lesson where the students discovered their learning using the many resources provided was her most memorable moment of the PBL study (I, 11/18/10, 3:00). The teacher also mentioned her interest in long term planning for more topics to expose her students to the use of PBL and discovery learning.

Quality

In order to establish quality in this study, triangulation of data from the interview transcriptions, observation field notes and logs, and reflective journal entries were used (Creswell, 2007). For example, I recorded in a journal entry that I felt that collaboration skills were being developed by the kindergarten learners through the use of PBL lessons (J, 10/28/10, 3:30). Interview responses revealed that the teacher also noticed that the students were cooperating with each other and working very well together (I, 10/12/10, 2:30). Participant observation field notes also showed evidence of students helping each other and working together (O, 10/06/10, 1:15; O, 10/13/10, 1:15). The teacher and I worked together to use student quotes from the participant observation field notes and teacher responses from the interviews to compare what I had recorded in the journal entry. Having multiple data sources allowed the teacher and I to follow up on one source using another and therefore made the conclusions of the study more powerful (Hatch, 2002).

Another strategy to ensure quality for this study was through the use of peer debriefing sessions (Lincoln & Guba, 1985 as cited by Creswell, 2007). A former kindergarten teacher volunteered to participate as a peer debriefer. According to

Creswell, the role of the peer debriefer was to ask questions about the methods being used in the study, about my interpretations, and about the thoroughness and congruence of the study. The peer debriefer in this study questioned me regarding the time frame allotted for the lessons, the need and ability to provide constructive feedback to the teacher, the importance of strong classroom management in a PBL setting, and how students can relate to the problems posed in the units to keep learners engaged. Both the peer debriefer and I kept written logs of the sessions that were held once a week. A sample peer debriefing log is included in appendix I. The peer debriefing sessions helped keep me honest and focused on collecting accurate facts that contributed to the quality of the study (Creswell, 2007).

Conclusion

This qualitative study was conducted to explore the ways in which PBL activities can be developed to promote 21st century learning opportunities for kindergarten students. The data collected through observations, participant journals, and a series of teacher interviews determined the best ways that the PBL lessons could be created to meet the needs of these learners. Results of this study clearly indicated that in order for kindergarten students to acquire 21st century learning skills, there needed to be a change in the teacher's role of feeding information to the students to guiding learners through discovery. The teacher used prompting, modeling, guiding, and letting go of power as she developed this role for herself. In addition to the four anticipated student learning outcomes, results of this study indicated they also developed important social skills and began using their newly developed communication, collaboration, decision making, and problem solving abilities during other parts of the school day. The study portion of this

project study resulted in two PBL lessons that were grounded in and created based on the ways that kindergarten students learn. Results of this study show that these lessons were successful in providing learning opportunities for kindergarten students to acquire 21st century learning skills. Results also clearly indicate the need for precise implementation guidance for the classroom teacher as well as a guide for how to develop future PBL lessons based on student interest and the underlying curriculum in use. This is the focus of the project that is described in the following section.

Section 3: The Project

The Evelyn School district recently transitioned from a half day to full day

kindergarten program in an effort to better prepare young learners. A qualitative study

was conducted to explore the ways in which PBL might be used in the kindergarten

classroom in order to give students opportunities to develop 21st century skills. Results of

the study indicated that these young learners could gain the particular 21st century

learning skills of collaboration, communication, decision making, and problem solving.

In a PBL setting these students gained important social skills that were translated into

other parts of the school day. More importantly, the study showed the ways in which the

role played by the classroom teacher in this student centered setting along with certain

PBL lessons brought about these opportunities to gain 21st century learning skills. The

PBL units used in this study were created and modified based on classroom data collected

from the classroom observations and the teacher as she renegotiated her role. These two

lessons along with a teacher guide that is based on study data form the basis of a guide

for teachers in the district who want to create a similar PBL setting in their classroom.

This section includes the description, goals, and rationale for this project as well as a

literature review connecting current research and theory to this project. A proposal for

implementation, an evaluation of the project, and implications for change are also

included.

Description and Goals

Two units of PBL lessons were created and modified throughout a 7 week period

in a kindergarten classroom. The first unit focused on nocturnal animals while the second

unit contained content about the Thanksgiving story. Classroom level observations,

participant observations, and interviews with the teacher were conducted as well as journal entries recorded weekly to collect qualitative data. The data collected during the study informed the creation of the guide including sample units, projects, and resources for instructors using PBL.

This project addressed the problem of fulfilling the full day kindergarten schedule with a curriculum that allows for the development of 21st century skills using PBL by providing a guide for teachers in the Evelyn school district. The students from this study developed 21st century learning skills such as collaboration, communication, decision making, and problem solving as well as social learning skills. The lessons that emerged from the study and that are used as a basis for this project provided interdisciplinary activities for students to complete while learning to work with others and find solutions to the problems presented during the full day kindergarten schedule. By using the guide created as a resource, teachers are equipped with information for how to get started using PBL and teaching the 21st century skills in their own classrooms.

The end product from the study consists of a guide to be used by teachers for implementing the PBL lessons that were used in this study and for developing problems that correlate with future themes in the literacy program to use with their students (see Appendix A). Sample problem statements, lessons, possible expectations, and outcomes from the lessons implemented during the study are available to assist teachers with implementation. The guide provides teachers with the reasoning behind the decisions made during the implementation of the lessons and directs teachers on how to make decisions during their own implementation.

The ultimate goal of this guide is to afford teachers with the understanding of how to help their students develop 21st century learning skills through the use of PBL lessons. Another goal would be to provide curricula to be used during the full day kindergarten schedule in the Evelyn school district with engaging lessons taught by informed and flexible teachers that promote discovery and social learning. This project aims to give teachers a starting point for implementing PBL lessons in their own classrooms by providing suggestions for implementation and potential learning routes. A final goal for this project is to allow teachers to use a different style of instruction to help learners successfully learn content and 21st century learning skills.

Rationale

The purpose of the project created based on the results from the study is to equip teachers with a guide for creating and implementing meaningful PBL lessons that promote 21st century learning skills. PBL lessons are student centered and use small groups and active learning, as well as independent work time (Drake & Long, 2009). However, this type of learning calls for teaching techniques that differ from traditional styles. As was the case in this study, teachers often find it difficult to adopt a new style of teaching (Johnson et al., 2009). For this reason, a guide for implementing PBL lessons was created to give teachers a framework for getting started. In order to transform their teaching into a non-traditional approach and utilize this guide, teachers need to feel supported (Johnson et al., 2009). When teachers feel supported they can comfortably take risks, learn new techniques, and patiently persist when successful results are not immediate (Johnson et al., 2009). The guide created for this project study aims to support teachers as it guides them through the decision making process for implementing and

planning lessons. Teachers can shift into non-traditional styles of teaching using this guide as it allows them to plan and reflect on successes and areas that need improving. The guide includes suggestions for collaborating with other kindergarten teachers that are also persisting through the change in teaching style. Having a support system with collegial sharing of ideas, experiences, and questions can encourage the teachers to improve their teaching techniques (Johnson et al., 2009).

Though the Evelyn school district transitioned from a half day program to a full day program in 2006, a new curriculum has not been adopted to meet the students' needs during the second half of the day. This project addresses the need for universal content to be implemented in the afternoons that relate to the mandated literacy curriculum being used during the morning lessons. The transformation of the teachers into their new roles begins with teaching familiar content in a new way. The teachers can use the guide to follow the sample unit lesson plans or create their own problems based on the mandated literacy units.

Findings from this study show that 21st century learning skills can be developed when PBL lessons are used with kindergarten students. These skills are developed when social learning is encouraged and a shift occurs in the teacher's role. The outcome of this project helps teachers create similar opportunities for 21st century learning to occur in their own classrooms by providing the teachers with a guide for implementing sample lessons, reflect on what worked, and revise as needed to match their students' needs. The content of this project addresses the problem statement by creating a teacher's guide for teaching using PBL to be used during the second half of the school day.

Review of the Literature

This literature review includes evidence as to why a teacher's guide was created for this project study. Decisions for choosing this specific genre were made based on the current research review and data collected during the study. As the study progressed, it became apparent that a shift in the teacher's role was necessary to include the abilities to facilitate small group learning and to practice modeling. Along with this shift, other changes emerged like teacher collaboration, working together to experience successes, and learning from struggles that occurred during the shift. This teacher's guide was created to support and inform the teacher as plans are developed, lessons are implemented, and instructional decisions are made.

Various journals from EBSCOHOST and Sage were reviewed for this literature review. Databases like ERIC, Academic Search Complete, Education Research Complete, and Teacher Reference Center were used for finding literature involving PBL theory, social constructivism, and social learning. Several key words and phrases like *problem based learning*, *teacher's role*, *social learning*, *small group learning*, *constructivism*, *social constructivism*, and *teacher modeling* were used to provide a rationale for this project**.**

Changes in Teacher's Role

Both current research and the results of this study showed that the teacher's role is different in a 21st century classroom than in a traditional classroom. Because the activities planned and the resources and materials used are unique in a 21st century classroom and the responsibilities of the teacher differ, this project was created to support the teacher in

transitioning to this new role. The teacher takes on the role of a facilitator, a guide, and a supporter of the learners in a 21st century learning environment like a PBL classroom.

The facilitator develops problem statements, conducts lessons, and creates activities for students to participate in with collaborative groups (Pressler, 2010; Skowron, 2006). Sample problem statements, lessons, and activities are included in the teacher's guide to help facilitate a collaborative learning environment. Teachers incorporate the standards while planning authentic learning experiences that include technology and promote social learning (Skowron, 2006; Trilling & Fadel, 2009). Whole group discussions are facilitated and feedback is consistently provided to encourage learners (Glazewski & Ertmer, 2010). Teaching shifts from a content approach to a process approach (Skowron, 2006). This project is an example of a process approach to teaching and learning. Teachers do not focus on right and wrong answers, instead the emphasis is placed on discovering the content and making meaning of what is learned (Pressler, 2010).

As the activities change in a PBL setting, the materials used in the classroom change as well. The sample lessons included in this project show the need for teachers to search for resources beyond the textbooks. Technology resources and original artifacts are used to enrich instruction (Furtado, 2010). Ideas for different types of resources to include with PBL instruction are listed in the teacher's guide. Teachers also begin to create their own resources or modify existing materials to specifically fit the needs of the learners. The materials are used to support the teacher and direction of the lessons (Pedersen, Arslanyimaz, & Williams, 2009).

The responsibilities of the teacher are different in a 21st century learning

environment than in a traditional learning environment. The teacher's primary role in the

classroom is as a guide and a supporter of the learners. Teachers modify their own styles

of instructing to support their learners (Glazewski & Ertmer, 2010; Pedersen et al., 2009).

The classroom teacher, or guide, provides support to the learners in a way that they feel

safe to make errors and learn from the ongoing struggle to find solutions (Trilling &

Fadel, 2009). As facilitators, they help their students to understand their own thinking

(Skowron, 2006). Other roles and responsibilities like observer and listener are included

in the teacher's guide. Teachers in a 21st century learning environment understand their

students' needs, allow them to experience their learning on their own, and step in to

provide assistance at the appropriate times (Skowron, 2006).

Modeling

When teachers shift into the role of facilitator, the instructional techniques used in

the classroom change as well. This project was created with an emphasis on modeling as

it is a critical component of teaching using PBL. Because the young learners are being

exposed to this new type of instruction, modeling is necessary throughout each lesson to

create a visual for how to behave, how to learn, what is expected, and to show the

teacher's role during the learning (Loh, 2009). The teacher's guide was created to point

out specific times when modeling is necessary to introduce and apply the learning of new

skills based on data collected during classroom observations during the study.

Teachers explain and transfer knowledge during lessons in all content areas.

When demonstrations are coupled with explanations, students learn from what is being

modeled by their teacher (Loh, 2009). When students begin to imitate the teacher's

behaviors, they are learning in a natural and sometimes unintended way (Haston, 2007).

By watching, listening, and naturally learning, students copy the teacher's behaviors

which results in meeting classroom expectations. Along with modeling behaviors,

teachers also model attitudes and excitement towards learning. Tips for how to model

appropriate behaviors and attitudes are included in the teacher's guide created for this

project.

After observing a sequence of PBL lessons during this study in the kindergarten

classroom, it became apparent that the need for teacher modeling was necessary to show

the students how to communicate, collaborate, gather information, and learn in this

setting. In order for the young students to practice, learn, and imitate these skills, the

teacher needed to model, or demonstrate the skill for the class (Haston, 2007). The main

concepts modeled in the beginning of this study were how to sit with your small group

and participate in a conversation, how to be a respectful communicator that looks at and

listens to the person speaking, how to use resources appropriately, how to share

knowledge learned with the class, and how to work in collaborative groups. Because the

learners were unfamiliar with these skills, the teacher needed to model each concept and

the students would practice until their imitation matched the teacher's model (Haston,

2007). It was also helpful to have student volunteers model for the rest of the class as this

showed a small group of children's immediate understanding of the concept. Another

useful modeling strategy was used by the teacher when she would model what she

wanted her learners to do as she spoke with the whole group. For example, while

addressing her class the teacher would remind them to raise their hand to offer their ideas

and she would raise her hand as she explained this. If students forgot to raise their hand,

the teacher would simply raise her hand as a model to remind the learners of the correct

procedure for sharing. This process of modeling allowed the students to learn naturally by

imitating (Haston, 2007).

Another important aspect of modeling is for the teacher to display enthusiasm for

the content. Children follow the attitudes and behaviors of adults if the adults perceive

the content as important (Loh, 2009). With this idea in mind, if a teacher delivers a

problem or an idea for a lesson with enthusiasm and importance, it is likely that the

learners will adopt the teacher's attitude towards the topic (Loh, 2009). The importance

of teacher modeling is stressed in the teacher's guide to help relay the message to the

learners that the content is meaningful. When students feel that the activities in school are

worthwhile, they are more inclined experience learning (Loh, 2009).

Facilitating Small Group Learning

Along with modeling, being able to facilitate small group learning is an important

role of the instructor in a PBL setting. This teacher's guide was created to assist teachers

in knowing when to use small group instruction, provide the responsibilities of the

facilitator during small group time, and how to direct learning and tailor specific lessons

during small group learning.

PBL classrooms offer small group learning situations. As students work with their

collaborative groups around the classroom, the teacher has the opportunity to visit with

small groups to provide feedback and specific guidance (Wasik, 2008). The facilitators

are able to support and encourage developments within the different groups (Wasik,

2008). Sample lessons are included in the project to show what types of activities lend

themselves to small group work with young learners. Small group learning also offers the

teacher a chance to probe individual understanding of the content without losing the interest of the rest of the class (Wasik, 2008). The teacher can learn what each child in the small group is learning during their PBL experience.

The facilitator has the responsibility of placing the learners into groups, planning activities that involve a variety of skills, preparing learners to work cooperatively while learning from each other, and communicating with the students in a way that encourages discovery and learning (American Federation of Teachers, 2010; Dangel & Durden, 2010). Included in this project are ideas for grouping students as well as ways to display group names and their work around the classroom. In order to engage all learners, activities need to be differentiated to meet all ability levels (American Federation of Teachers, 2010). Different activities for children of all skill levels are incorporated in the sample lessons of this project. An important role of a PBL facilitator is preparing the learners to work together. Modeling these skills is crucial to the student's success in this type of learning environment. As teachers meet with small groups of learners, their purpose is to encourage participation, respond to their ideas, assess what they are learning, and promote further thinking (Dangel & Durden, 2010). The way the teachers communicate with the learners is critical in that it encourages the children and shows them that their efforts and ideas are valued (Dangel & Durden, 2010). Ideas for how to communicate with learners in an encouraging manner that promotes thinking is included in the project.

Social Constructivism

The teacher transforms into a facilitator in a PBL classroom (Dalsgaard & Godsk, 2007). Outside of the classroom, changes are occurring as well to prepare lessons in a

new way, gather resources, and reflect on what is working and what still needs improving. Teacher collaboration is an important component of this project. The teacher's guide was created to help the teacher during the school day and after the lessons have been implemented. Suggestions for learning from each other are included in the project as the social aspect of collaborating is significant to the success of the transitioning teacher.

This project is rooted within the social constructivist theory. The foundation of social constructivism is that social learning is a critical piece of learning (Powell & Kalina, 2009). Learning is comprised of social interactions, collaboration, and critical thinking (Powell & Kalina, 2009). Learning in a PBL setting allows for social interactions, working and learning together, and the development of higher order thinking skills. Just as the students will collaborate and learn from one another, the teachers using this guide will learn from each other as they share ideas and experiences (Johnson et al., 2009). For this reason, the theory of social constructivism was used to guide the development of this project.

The theory of child development incorporates the idea of the zone of proximal development (Powell & Kalina, 2009). This zone is described as a place where children learn best when working with others and when receiving support from others (Powell & Kalina, 2009). Adults also experience optimal learning when supported by peers and superiors. In a social constructivist classroom, much like a PBL environment, the teacher acts as a support system that guides the children through solving a problem. This project helps teachers as they change into their new role as supporters of their learners by providing hints for how to prompt and encourage. Because students learn at their own

pace and in their own way, students acquire knowledge by experiencing their learning (Powell & Kalina, 2009). Teachers determine children's level of understanding and then guide the active learners through new experiences with engaging materials rather than simply verbally transferring knowledge to passive learners (Gambrell, Morrow, & Pressley, 2007; Reed, Smith, & Sherratt, 2008). The previously defined role of a student included sitting and receiving information and the role of teacher included standing and delivering information (Johnson et al., 2009). This project helps the teacher support students as they learn at their own pace from various resources, including each other. The teachers also learn from many resources, including this project, for how to implement PBL lessons and change the learning environment of their classroom.

As the teacher and students experience learning and working with others to learn, they begin to internalize what they have learned based on their experiences and support (Pence & Justice, 2008; Powell & Kalina, 2009). Based on this theory, the use of PBL as it encourages experiential learning and collaboration with others is appropriate for addressing the problem in the Evelyn school district. The PBL lessons used in this study created opportunities for the students to interact with each other, construct their own knowledge, and internalize what they had learned (Reed, Smith, & Sherratt, 2008). Similarly, the teachers can then collaborate and discuss their successes and failures with PBL to improve their own techniques after experiencing and internalizing this new way of teaching.

As optimal learning environments are created for kindergarten learners, the hope is that the scores on mandated state tests will increase as well. Adams (2006) believed that students learning in a social constructivist classroom learn to understand the details

of the test questions and therefore have a better chance of choosing the correct answer.

The Evelyn school district is looking to raise the overall scores on mandated state tests.

For the past several years, the Evelyn school district has been placed on a watch list due

to these scores. This project gives this district a different avenue to try a different

approach starting at the kindergarten level. Using PBL within a social constructivist

framework with young learners teaches them to make sense of what they have learned,

internalize meaning, and examine their own thought processes (Adams, 2006). As

teachers shift into a supporting role, they will be able to use this project as a training

guide to help their students experience their learning in a favorable learning environment.

Problem Based Learning Theory

Just as the students are expected to work together and learn from one another,

teachers transitioning into the role of facilitator in a PBL classroom need to learn these

skills as well. The PBL theory includes the idea of learners encouraging and supporting

each other in order to be successful. Taking risks and not being afraid to fail are factors

for learning in a PBL setting. This guide was created to show teachers how to practice

these skills and learn from each other in a collaborative and encouraging way to gain

confidence in their own practices as they facilitate learning and grow as professionals.

An example of a constructivist learning environment would be a PBL classroom.

The constructivist learning model includes centering learning around a relevant problem,

supporting and challenging the learners, encouraging collaborative learning, and

modifying the lessons based on student questions and interests (Torp & Sage, 2002). The

PBL theory identifies teachers as facilitators that support and guide the learners to

generate possible solutions to relevant problems using collaborative group work (Torp &

Sage, 2002). Due to the roles of the learners and teacher, as well as the student centered

and social learning environment, PBL exemplifies the constructivist learning theory.

PBL classrooms are student-centered and promote self directed learning

(Beacham & Shambaugh, 2007). Students begin by being introduced to a problem and

then stating what they know and what they need to know in order to find possible

solutions to the problem. The students find facts, make observations, inquire, and

experience their learning as they work to solve the real life, relevant problem (Furtado,

2010). The inquiries become the focus for the problem as the students question their

findings and explore the content further (Skowron, 2006). Not only are the problems

relevant and meaningful but the materials used to solve the problems are relevant and

useful in the process (Downing, Kwong, Chan, Lam, & Downing, 2009). Along with

various materials, the students make use of their teacher and classmates as valuable

resources. Through social interactions within collaborative group work and partner

activities, students monitor and direct their own processes of problem solving (Downing

et al., 2009).

The problems presented in PBL classrooms are ill-structured, authentic, and

require the students to call upon many different resources in order to solve (Beacham &

Shambaugh, 2007). The students lean on their social interactions to learn from each other

and the teachers equip the students with tools and processes to use when approaching a

problem (Treffinger, Isaken, & Stead-Dorval, 2006).The students share their own ideas,

develop new ideas, and plan solutions (Treffinger et al., 2006). Because the problems are

relevant, the students are engaged and motivated to develop and share their ideas

(Skowron, 2006). The processes used to solve the problem are dependent on the problem.

The problem can change as students question and find solutions. Instead of seeking right or wrong answers, students in a PBL classroom find solutions and understand that there is no wrong way to study the problem and that no solutions are wrong (Skowron, 2006). Because students can take risks as learners without the fear of being wrong, students are motivated and willing to learn.

Students gain a deep understanding of the content by working together and applying what they know to solve the problem (Glazewski & Ertmer, 2010; Tarhan, Ayar-Kayali, Urek, & Acar, 2008). The problems are designed to also increase higher order thinking skills (Glazewski & Ertmer, 2010). Students learn new information by directing their own learning, using self evaluation, reflection, and social learning. The foundations of constructivism are apparent in PBL environments as students experience their learning in authentic settings. Content is learned and understood at a profound and meaningful level as higher order thinking and social skills are simultaneously acquired. The sample PBL lessons are included in this teacher's guide along with instructions for implementation.

Social Interactions Promote Learning

Social interactions among students and teachers create optimal learning in PBL settings. This project guides teachers through facilitating social interactions with young learners. It also stresses the importance of social learning as it contributes to the acquisition of 21st century learning skills.

In a traditional learning environment, social learning is not as much a part of the mandated curriculum as academic learning (Rekalidou & Pliogou, 2006). How students perceive themselves as learners and behave in group situations is the basis for social

learning in a traditional environment. Teachers tend to be more focused on academic over social learning. In PBL and other constructivist classrooms, social learning is at the forefront alongside academic learning. Successful results have been obtained using PBL in community college classrooms in providing opportunities for social learning experiences that in turn help students to succeed academically (Miranda, 2007). Research is lacking in showing whether the use of PBL in early elementary grades aid in supporting young learners to develop social skills.

The results of this study show that the PBL lessons gave the kindergarten students opportunities to work with other children. The teacher's guide will allow teachers to learn how to facilitate such social learning in their own classrooms. According to Schiller (2009), early social interactions are crucial in determining how people will relate to others later in life. Children need to learn how to interact socially and relate to others within the first few years of their life (Schiller, 2009). These social skills begin at home with parents, caregivers, and siblings and then occur with teachers and classmates during early learning experiences. Lev Vygotsky believed that teachers need to build a classroom where student interactions are prominent (Powell & Kalina, 2009). Students need to feel that they belong in the classroom as well as feel connected to other students in order to truly experience learning together (Severiens & Schmidt, 2009). Group work and collaborative learning is more successful when students depend on each other and use each other's strengths to learn together (Severiens & Schmidt, 2009). Vygotosky believed in the idea of children working together by using their own strengths to contribute to completion of a task or project (Webb, 2009). Students benefit from social learning by carrying out a task with a more knowledgeable child helping a less

knowledgeable child by being a resource (Webb, 2009). Because students have different

strengths and weaknesses as learners, Vygotsky believed that students would explain

their thinking to demonstrate their strengths and contribute to other students learning as

well as their own understanding (Webb, 2009).

Small group work with young learners can be difficult if students are unable to

stay on task, ask good questions, and communicate respectfully (Harvey & Daniels,

2009). Social interactions need to be taught in order for collaborative work to be

successful. If the topic or problem is relevant, young learners tend to be able to have

discussions and ask questions (Harvey & Daniels, 2009). The key to including social

learning to promote student learning is to have relevant, meaningful content so that

students can interact with their classmates while experiencing their learning. Social

interactions begin at home and continue throughout the school years and then later

become a factor in adult life. Participating in learning communities by developing social

skills, sharing ideas, and asking questions are essential in preparing for further education

and life outside of the classroom (Trilling & Fadel, 2009).

Implementation

As the project study concluded it became evident that the subsequent steps needed

to be identified in order to move forward with meeting the needs of full day kindergarten

learners. Teachers need to be informed as to how to conduct PBL lessons in their own

classrooms. The kindergarten teachers in the Evelyn school district could benefit from the

guide provided in this project as a means of becoming more familiar with the teaching

and learning process in a PBL environment. Teacher's guides need to be supplied to all of

the kindergarten teachers in an effort to equip them with tools and resources for

implementing PBL in their own classrooms.

Potential Resources and Existing Supports

I can serve as a resource for the kindergarten teachers. The information that I

gathered for this project includes multiple websites, articles, and books focused on the

purpose, process, creation, implementation, and assessment of learning in a PBL setting. I

also have experience teaching kindergarten students using a PBL approach. The

kindergarten teacher that participated in this study can also be used as a resource to share

her experiences with the other teachers. The guide created for the teachers will serve as a

resource to support teachers as they shift into their new roles as facilitators in PBL

classrooms.

Potential Barriers

In order to execute the implementation of further PBL lessons, time needs to be

afforded to the kindergarten teachers to meet as a team, observe experienced teachers,

and develop PBL lessons to supplement the mandated literacy curriculum. Along with

time, funding may impede following the necessary sequence for implementing the PBL

curriculum. Teachers may require release time from their classrooms to attend meetings

and complete observations which will involve hiring substitute teachers. Time and

financial support may prove to be barriers the school district faces as they attempt to

move forward with this implementation.

The biggest obstacle to overcome will be those that are unwilling to change their

current styles and techniques in the classroom. The teachers resisting the change will

pose as a barrier as they face changing their attitude, perception, and responsibilities as a

facilitator (Johnson et al., 2009). Along with the teachers, students may also resist the change as it differs from the learning style that they are used to. Becoming acclimated with proposed problems that have more than possible solution, will be a hurdle for the resisting learners as well (Johnson et al., 2009).

Proposal for Implementation and Timetable

Equipping the teachers with the guide created for this project will begin during the 2011-2012 school year. Teachers can begin viewing the sample lessons and meeting together to discuss their thoughts, ideas, and plans. The next step would be to begin creating and implementing problems in their own classrooms using a trial and error method. Teacher flexibility with this learning process will be required. As some teachers become more comfortable with this style of teaching, others can visit their classrooms to observe. Time needs to be afforded for teachers to begin meeting as a team and observing experienced teachers as well as practicing teachers. From here, universal content needs to be discussed by the team of kindergarten teachers to match the mandated literacy curriculum. Once topics have been identified, the teachers can start creating problems that correspond with the content. By the beginning of the 2012-2013 school year, the kindergarten teachers should be using PBL during the second half of the school day to cover math, science, and social studies content as it relates to the reading and language arts program.

Roles and Responsibilities of Student and Others

According to Dewey (1938/1997), it is the responsibility of the students to learn. In order to support students as they learn, the teachers should create PBL lessons that promote opportunities for optimal learning experiences. The teacher's role shifts to

support learning in a student centered environment that allow students to take ownership and responsibility for their own acquisition of knowledge. The role and responsibility of the school district is to offer the teachers time for professional development and team collaboration to create such environments and lessons.

<div style="text-align: center">**Project Evaluation**</div>

In order to determine what works and what needs to be changed, the team of kindergarten teachers will continuously meet to reflect on their experiences. There will be surveys for the teachers to complete quarterly to collect feedback on what has been successful and what has not in their classrooms. The surveys can also be used to learn more about what the teachers feel that they need to best create and implement PBL lessons. The students and their work will also be used to evaluate the effectiveness of the PBL lessons through the use of performance assessment. Student research as well as work samples will be kept in portfolios to be reviewed during and after each unit. The portfolio will be used to show progress in learning content area. Observations will be recommended to be completed by the teacher throughout each unit to record evidence of the development of 21st century learning skills. At the end of each unit, students should deliver presentations with their group members to share their solution to the problem as well as their explanation for choosing their final solution. Zane (2009) explains that performance assessment measures the ability to apply and transfer knowledge. Instead of simply evaluating recall of facts and concepts, performance assessments evaluate the students' ability to construct knowledge and then apply that new knowledge in real-world situations (Zane, 2009). This type of student evaluation aligns with the constructivist beliefs as it incorporates students making meaning and learning from their experiences

and interactions with others and then applying what they have learned (Harlow &

Aberasturi, 2006; Yuen & Hau, 2006; Zane, 2009).

Because this project will be used to ensure that the goals of instruction and

student learning are being met, a formative or process evaluation will be used in order to

gauge this project's effectiveness. This type of evaluation was chosen because the project

will be used by kindergarten teachers to make improvements to teaching and learning to

determine if it is appropriate for helping kindergarten students gain 21st century learning

skills. Teacher surveys and student work samples will be used to examine the outcomes

of this project. The overall evaluation goals for this project include presenting the

findings to the team of kindergarten teachers as well as the administration in the Evelyn

school district, helping teachers feel comfortable with a change in their role and

instructional style, and giving kindergarten students the opportunity to learn, apply, and

transfer 21st century learning skills. The major stakeholders are the kindergarten students

as they will be given the opportunity to learn and develop new skills. The kindergarten

teachers are stakeholders as well as they will be learning about new teaching techniques

and challenging themselves to take risks, be flexible, and change.

Implications Including Social Change

Local Community

For the past 7 years the Evelyn school district, according to the Evelyn School

District Illinois Interactive Report Card (2010), failed to make adequate yearly progress

and has recently been identified as academic early warning state status. In 2010, fifty five

percent of the Evelyn public school elementary students were identified as low income.

As mentioned previously, low income students tend to struggle in school settings due to

poor attendance, limited vocabulary, and limited early learning experiences (Schroeder, 2007). This project aims to equip teachers with a guide that can encourage the development of rich learning experiences within a full day kindergarten framework which allows for more time in an educational atmosphere and more opportunities to strengthen vocabulary. Students that are afforded these experiences will build a stronger foundation that can lead to success on state mandated assessments in grade levels that follow. Teachers using the guide created are given the opportunity to review their own instructional techniques as they relate to student success and make necessary changes to reach more learners using the PBL approach. The schools and local community stand to benefit from this groundwork as 21st century skills are acquired by young learners and then further developed and carried over into the workplace.

Beyond the Local Level

In the larger context, kindergarten teachers could use this guide across the state of Illinois to learn how to implement PBL lessons to promote social and discovery learning and build a strong foundation for education. Mandated test scores could increase as young learners develop the ability to problem solve and make informed decisions. Across the nation, schools in low income areas could use PBL to provide early learning experiences rich in vocabulary and relevant topics. This project also shows that when teachers are willing to make changes in their own instruction, students can make gains by learning in a nontraditional environment. As teachers become accustomed to flexibility and staying current with best practices, students can be afforded new opportunities to participate in engaging lessons and learn content as well as real world skills.

Conclusion

This project created an opportunity for teachers to learn a new style of instruction that involved modeling, small group facilitating, and guiding learners through the content. The results from this project can have an impact on the local level as well as throughout the nation. The next steps for following through with creating change and fulfilling the second half of the school day are included. The following section provides reflections on the process of researching and creating this project. The strengths and limitations as well as suggestions for future research are also shared.

Section 4: Reflections and Conclusions

A qualitative project study was conducted to explore the ways in which PBL lessons could be implemented in a kindergarten classroom to provide an engaging curriculum that allows for the development of 21st century learning skills and fulfills the full day schedule. PBL was chosen to supplement the half day curriculum as it allows students to experience their learning, interact with others to learn, and explore content in a self-directed manner (Beacham & Shambaugh, 2007; Furtado, 2010; Skowron, 2006; Treffinger, Isaken, & Stead-Dorval, 2006). Based on the findings of this study, a teacher's guide was created to help equip teachers with suggestions and ideas for developing 21st century learning skills in their students by implementing PBL lessons. PBL was used to supplement the mandatory curriculum using a different method of teaching that encourages collaboration, communication, decision making, and problem solving. The following section addresses the strengths, limitations, and recommendations for ways to address the problem differently as well as extensions of this project and analysis and reflection of the multiple roles of the researcher (scholar, practitioner, and project designer) and the importance of the project study.

Project Strengths

The project created for this project study addresses the problems of fulfilling the full day kindergarten program while giving teachers a tool to help students develop 21st century learning skills. The kindergarten classes in the Evelyn School district are currently implementing the half day curriculum during a full day schedule. This project

study was used to create a series of meaningful lessons along with a guide for their

implementation based on the results of the study.

Along with a teacher's guide to assist with implementation, two sample lessons

are included that directly relate to the content of the mandatory literacy curriculum. This

project has several strengths including a starting point for teaching 21st century learning

skills, guiding teachers as they go through a transition in teaching styles, and in providing

a tool for the kindergarten teachers to use when creating and implementing lessons of

their own.

This teacher's guide provides a starting point for teachers to begin instructing

students to develop 21st century learning skills. In order to prepare learners for the

following grades and for their future after school, teachers need to provide opportunities

for students to gain these skills. Through the use of PBL lessons, teachers will be able to

teach content along with skills needed to be successful in school and the workplace.

Teaching techniques will change as the teacher shifts into a facilitator role. As a

facilitator, instruction will occur in whole group and small group settings as well as on a

one-to-one basis. Facilitators will confer with students and tailor individual lessons to

meet the needs of specific learners. This guide will support teachers as they make this

transition by providing suggestions for different instructional techniques. Ideas for when

to make changes in the instructional setting and when to use techniques like modeling are

included to strengthen the teacher's practice during the transition. Suggestions for teacher

reflection and collaboration are also incorporated in the teacher's guide to provide

experiences for sharing with colleagues and refining one's own practice.

This guide is to be used as a tool by teachers developing and implementing PBL lessons with kindergarten students. A strength of this project is that it provides teachers with a tool for getting started and then allows the teachers to infuse their own styles and creativity into the lessons. After implementing the sample lessons and collaborating with colleagues, the teachers will be able to develop their own problem statements and implement their own lessons at their own pace according to their comfort level with the new teaching techniques. As a tool, this guide is a point of reference to be used throughout the development of lessons, implementation of lessons, and throughout the school year when questions arise during the decision making processes of teaching using PBL.

With this guide, the kindergarten program in the Evelyn school district becomes equipped with teachers prepared to assist students in developing 21st century learning skills. Along with helpful hints and suggestions for facilitators, this guide allows teachers to grow and change as they adapt to their new role.

Recommendations for Remediation of Limitations

Along with the strengths, this project has several limitations as well. With teacher flexibility and support from administration, the limitations can be overcome and teachers can feel comfortable and successful in their new role as facilitators.

The first limitation to this project is that the sample lessons cannot be exactly replicated due to the fact that the students guide the direction of the lessons. Because student interests and student discoveries play such an important role in PBL, different groups of students will investigate the content in different ways. The facilitator following

the sample lessons in the teacher's guide may struggle with the direction of the unit since the lesson plans cannot be duplicated in their own classroom. One way to remediate this limitation would be to provide professional development opportunities for the teachers. Learning from classroom observations and collaborating with PBL practitioners would be beneficial to overcome this weakness. Professional development along with the teacher's guide would give teachers the groundwork for using PBL in their own classrooms.

Another limitation to this project is that teachers may resist the change that is required. As teachers become comfortable with the content, they tend to teach it in their own way and may not be at ease with a change in their own techniques. In order to overcome this barrier, teachers need to have time to reflect on their practices and collaborate with other teachers to discuss their experiences, struggles, and successes. The participant from the study and I had the opportunity to collaborate and discuss which may have helped alleviate any discomforts with the changes in instructional techniques. By contemplating what works and what needs improvement, lessons become refined and students benefit from thoughtful, reflective lesson planning. The teachers will benefit as well as they learn about how other teachers are experiencing successes and failures and then discussing what can be done to make progress.

Scholarship

As I researched and conducted my project study, I learned that not everyone had the same views as me, that my passion grew as my research progressed, and that as a researcher I began to view data and results in a new light. When I began my research, I talked with friends and co-workers about PBL and most people just listened to the

information I had to offer. During discussions in different courses, classmates asked me

questions about my topic of research that made me think and inspired me to learn more.

Feedback on drafts from my instructors led me to new information and new resources

about PBL. When it was time for my study to begin, I had several conversations with the

curriculum director, principal, and other teachers at my school and I found that everyone

had different ideas and opinions about PBL. At first, I was discouraged by the negative

opinions and criticism. However, after researching further I became determined to clear

up the misunderstandings about the efficacy of PBL. By studying the ways in which PBL

could work in a kindergarten classroom, I was able to deliver evidence as support for my

argument.

I learned that I was becoming more passionate about my research topic as others

doubted my project study. Through a continuous cycle of reading, reflecting, writing, and

revising my passion grew and strengthened. I learned that the more knowledgeable about

the topic I became, the more confident I was to dispute the misunderstandings. PBL is a

topic I have been studying for several years. Negative views towards the topic seemed to

fuel my energy to learn more and create a solid study through which my passion could be

shared.

As I conducted my research, I learned to view data and results in a new way. My

study was initially planned to be quantitative, later it changed to a mixed methods study,

and it made a final transformation into a qualitative study. I wanted to capture rich,

authentic results. At first I considered noting the frequency of specific 21st century skills

in both a PBL classroom and traditional classroom and then comparing the finding to

demonstrate the results. After several discussions with instructors, I decided that I wanted to incorporate interviews and observations to give the participants' perspectives which changed my study to mixed methods. The more reading I did about PBL, the more I wanted to be immersed in what people were thinking about it. I wanted to know what the teacher thought and I wanted to watch the students experience it. Because I viewed my study as quantitative, mixed methods, and qualitative I learned about the different methods of research and the kinds of results each type portray. As my research progressed, my study evolved and my passion for creating change through the use of PBL grew.

As my interest in this project grew, so did my understanding of the importance of making data-driven decisions. As the study progressed, I learned that the decisions for planning lessons were directly affected by the research I had conducted, the needs of the learners, and the needs of the teacher. Changes needed to be made based on the teacher's comfort level with her transitioning role and according to the amount of resistance I felt the teacher was experiencing. The content was not covered in the original time frame that I had planned. Instead, lessons had to be slowed down to accommodate the teacher and her students as they adjusted to new styles of teaching and learning. Classroom management became an unexpected factor that caused delays in lesson planning as student behaviors frequently interfered with the teaching process. Because the teacher had never used PBL before, decisions about the direction of the lessons were made based on how much time was needed to model specific skills, practice the skills, and then apply the skills.

The teacher's guide written for this project is directly linked to decisions made in the classroom during the study. Teachers implementing the sample lessons will benefit from the suggestions that are included in the guide. These suggestions are the result of struggles during the study and are included in order to help the facilitator make decisions during their own PBL lessons. I learned I could not have written a teacher's guide based on sample problem statements without conducting the study and experiencing the teacher's resistance and struggles. Overcoming the failures and making spontaneous decisions based on data collected, is what makes this guide useful for teachers using PBL for the first time.

Project Development and Evaluation

I learned that developing a project that will be used as a tool by teachers needs to incorporate ideas and experiences from those teachers. Creating a project to be used by teachers involves making those teachers feel valued and important in the decision making process. I learned that developing this teacher's guide takes time and patience as it requires making changes to accommodate the teachers that will be using this project. Project development involves having a goal and then being able to revamp your plans and make constant adjustments.

The only true way to determine if this project is helpful and supportive to teachers is to allow teachers to use the guide and then provide me with feedback. Creating this project also calls for trial and error as the project is implemented and then changed to fit the needs of the teachers and their learners. The development and evaluation of this project has been an ongoing project with different opinions and ideas being shared and

embraced. The project developed is a tool to be used by teachers, to support teachers, made from data collected in the classroom, and involving teacher insights.

Leadership and Change

I learned that a strong leader can motivate others and involve the stakeholders in the decision making process. As a teacher leader in my own school and the project developer, I realized that in order to create change by implementing a new style of teaching and learning in kindergarten I had to get the teacher participant to believe in my project. Establishing a good rapport by being trustworthy, flexible, and open minded allowed the teacher to feel comfortable adding her own input. Feeling valued as a decision maker in the process of creating and implementing lessons allowed the teacher to also develop a sense of ownership in the project. Not only were the students guiding the direction of the lessons and feeling accountable for their own learning, but the teacher was also holding herself accountable for her students' success.

Flexibility was a key factor in acting in the best interest of the learners to create change. The teacher and researcher needed to be able to adapt to spontaneous changes in the direction of the lessons. In the future, as the team of kindergarten teachers work together to write and implement new PBL lessons, flexibility will continue to be crucial. Problems will be created and then discussed amongst the teachers to decide if revisions are necessary. New problems will need to be created as student interests change and also to relate the problems to current real world events.

I learned that change cannot occur without strong leadership. By doing this project, the kindergarten teacher and I became advocates for change in the Evelyn school

district. Together, a team can decide to make a positive difference in the groundwork of the education of young learners. Through the use of this project, the idea of using PBL in kindergarten inspired teacher collaboration as well as student collaboration. The students' motivation to learn increased as did the teacher's motivation to learn new teaching techniques. I learned that change is possible when decisions are made based on current research and best practices. I also learned that supportive and encouraging leadership can stimulate others to become involved in the process of change.

Analysis of Self as Scholar

Throughout the course of my research and the implementation of my study, I learned that I am a goal orientated learner and that I have high expectations for myself as well as for those I collaborate with. As a scholar and a teacher, I found that I am a team player that has much to contribute to my school, my students, and my colleagues. I consider myself a life-long learner that is motivated and driven to improve my teaching and learning techniques. The successful completion of my coursework at Walden University helped me to uncover the teacher leader that I had been striving to become. Confidence in my own practice continues to grow and even led me to take a new teaching position in a different school in my district where I was given additional opportunities to be a team member and a teacher leader.

Analysis of Self as Practitioner

Initially, I thought my research would always be centered on PBL. Over the past few years, I learned that my interests reach far beyond this sole topic and branch out into many different aspects of teaching and learning. Kindergarten will always have a special

place in my heart as well as my ongoing research, as I taught it for several years and fell in love with it the first day I started teaching. I would like to continue conducting research and working with kindergarten teachers to help make the first years of learning for children enjoyable and exciting. I truly believe that kindergarten is the foundation of a child's education and therefore needs to be a place where children experience rich and stimulating learning.

As a practitioner, I plan to continue to examine and compare my own ideas with the most current research and best practices. I also intend to continuously reflect, evaluate, and revise my own techniques and strategies in an effort to assess myself and improve.

Analysis of Self as Project Developer

As a project developer, I learned the importance flexibility and open-mindedness. After several conversations with my chair and teachers in my district, I was determined to create a tool for teachers that would support them and guide through a transitional time period. First, I needed to be flexible with scheduling phone conversations with my chair and meetings with kindergarten teachers. I was interested in learning what the teachers needed in order to feel supported and I wanted to produce a product that was a reflection of what was conveyed during these meetings. At times it was difficult to consider other viewpoints when I thought I had a clear vision of what I wanted my project to be. As a project developer, I learned to accept constructive criticism and remain open minded while keeping the goal of creating a guide that will benefit the teachers and the learners in mind.

As a project developer, I also learned that I was driven to create a tool to be used in my district to assist the struggling teachers and learners. Because state test scores landed my district on a watch list, I felt motivated to create change with the teachers that were feeling defeated and unappreciated. After putting forth so much effort using traditional teaching styles, the teachers needed to change and try something new to prepare the students with skills not just for test taking, but for the rest of their life in schools and the workplace.

The Project's Potential Impact on Social Change

This project shows that teaching students 21st century learning skills can be incorporated into the content areas in a kindergarten classroom. Even at the most basic level, skills like communication, collaboration, decision making, and problem solving can begin to develop at an early age when students are exposed to an environment that allows for such experiential learning and growth. From here, students can move from kindergarten to the early elementary grade levels to strengthen their critical thinking abilities and continue to apply the 21st century learning skills. The implications for positive social change include preparing students for their educational journey as well as life in a workplace, potentially equipping learners with the tools necessary to be successful with high stakes testing, and instilling a love for learning in young children.

Teaching children how to acquire new knowledge and apply what has been learned, rather than only teaching content, prepares them for life beyond their education. In a kindergarten setting, the basic foundations for 21st century learning skills can be obtained. Young children can learn how to find information, research, communicate, and

work as a team member. They also learn to use problem solving socially in their

relationships and friendships as well as in determining if a solution is possible as they

work to solve a problem posed through discovery learning. These skills can later be

applied in higher grade levels and eventually lead to success in the workplace.

As early as third grade, students are expected to perform on high stakes tests.

Through consistent application of the 21st century skills from kindergarten to the third

grade, students can build up higher order thinking skills. The critical thinking skills that

have been continuously practiced as students experience learning can aid in test taking

strategizing involving the use of process of elimination and informed decision making.

As a result, students can potentially successfully perform on mandated tests.

Kindergarten students learning in a PBL setting can be afforded the opportunity to

gain 21st century learning skills through discovery and problem solving. Because for

many students kindergarten is the first structured learning experience, it is critical that the

children begin their education on a positive note. Feeling valued as a team player and

feeling confident as a learner can be achieved as students are encouraged to learn through

exploration. Problems are developed based on student interests and lessons are created in

a sequence determined by student learning. Incorporating appealing topics and building

self worth as a learner can lead to increased levels of motivation for learning.

A portion of the students in the Evelyn school district are living in poverty.

Starting an education that is rich in experiences and offers engaging content can be

stimulating and encourage young learners to play an active role in earning an education.

Equipping students with the tools necessary to feel confident about learning can

potentially break the cycle of poverty in Evelyn. The Evelyn school district will be providing an education that motivates students to continue learning beyond elementary school and hopefully into high school, college, and beyond.

Implications, Applications, and Directions for Future Research

This project study addresses the need to fulfill the full day kindergarten program in the Evelyn school district while offering the students opportunities to develop 21st century learning skills. In regard to the second half of the school day, there are a number of possibilities for how the teachers could fill the time with purchased curricula. PBL, however, addresses the need for a curriculum that allows for engagement and discovery, and encourages critical thinking.

The results of this study could inspire future research to be conducted with kindergarten students and other early elementary students. A series of problems could be developed, multiple resources attained, and lessons could be implemented in a kindergarten classroom for an entire school year. The students who learn in this kindergarten classroom could be compared to students learning in a traditional kindergarten classroom in a qualitative study. Years later, scores of the students from both learning environments could be compared on mandated state tests. Another possibility for future research could be to continue developing 21st century learning skills through PBL lessons in first, second, and third grade. Similar to the previously mentioned option, test scores from these students could be compared to elementary students learning in a traditional environment. A mixed methods study could also be conducted to include

qualitative data from interviews with the teachers in the PBL and traditional learning environments as well as quantitative data gathered and compared from test scores.

If students had the opportunity to learn in an environment that encouraged the development of 21st century learning skills, the progress they potentially could continue to make throughout their education could have a strong impact in the educational field. Data collected from this study and through future research could help leaders in school districts make informed decisions about how to give students opportunities to learn in a student-centered, authentic learning environment. The skills developed in school could then create a high number of able and proficient graduates entering the workforce.

Current research is available on middle school, high school, and college leveled learners using PBL (Goodnough, 2006; Herron & Major, 2004; Pennell & Miles, 2009; Tarhan & Acar, 2007). Additional research at the elementary school level could add to the results gathered during this study and other studies using the higher grade levels. Strong results could be obtained from using PBL in a series of grade levels. Future research could focus on 21st century skills learned in PBL settings in all grade levels compared to 21st century skills learned in other settings.

Conclusion

The results of this study show that kindergarten students can develop 21st century learning skills while learning new content in a PBL setting. This study also addressed the need for change to fulfill the full day kindergarten program. Through strong leadership, flexible participants, and informed decision making based on research, kindergarten students in the Evelyn school district were afforded the opportunity to experience

learning using PBL. Continued research and teamwork to create new problems is

necessary for ongoing change to occur as the best interests of the students motivate

teachers to provide optimal opportunities for engaged learning.

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Appendix A: The Project

Teacher's Guide for Implementing and Creating Problem Based Learning Lessons

This teacher's guide is designed to equip teachers with research-based materials for teaching using problem based learning (PBL) and to support them as they transition from a traditional role in the classroom to a new role as a PBL facilitator. Because PBL asks for students to learn in a new way, teachers need support as they learn how to facilitate such learning. Research studies have shown that PBL lessons can be created and implemented that allow young students to experience their learning, achieve academically, and gain the skills necessary to prepare them for the rest of their education and their future in the workplace – such as decision making, problem solving, and the ability to work collaboratively with peers. This guide provides an introduction to PBL, ideas for future implementation, sample future problems that relate to the district curriculum's literacy themes, and sample lesson plans with helpful hints for the facilitator. It is intended to further the effort in the district to both fulfill the full day kindergarten schedule and raise mandated test scores.

Getting Acquainted With PBL

What is PBL? PBL is a type of learning that begins with an ill-structured problem presented to the class. The students work independently and in groups to uncover possible solutions to this ill-structured problem. Students are given access to multiple sources of materials and guided by the teachers as they discover new information, they rule out previous solutions and add new ones. It is the teacher's responsibility to create

problems that will interest and engage the learners. The table below lists the different

elements that are considered when writing a problem statement.

What to Consider When Creating Your Own Problem Statements

▶ Problems need to appeal to the children.

▶ Problems need to be age-appropriate.

▶ Problems need to be open-ended with no right or wrong answers, rather have

   multiple possible solutions.

▶ Problems in kindergarten should allow students the opportunity to pretend.

▶ Problems should give students an important task that is relevant and meaningful.

▶ Problems can be centered around a story.

▶ Problems can be about the students.

▶ Problems can involve mystery and allow students to explain what they observed

   as witnesses.

▶ Problems should allow students to be active participants in finding solutions.

▶ Problems should relate to the topics and themes being taught during other parts of

   the school day.

The teacher plans activities and guides the learners through a series of lessons that

allow the students to learn about the concepts necessary to explore and ultimately solve

the problem. The direction of the lessons is guided by the planned potential learning

routes, content areas the teacher plans to guide her students through in the unit, created

by the teacher and also by the students' interests and discoveries. Students learn skills

and content through a variety of activities facilitated by the instructor. Examples of

classroom activities that promote learning in a variety of settings are included in the table below.

Table 1

Example Classroom Activities is Various Learning Settings

Learning Setting	Activities
Whole Group	• Poster/chart making
	• Sharing ideas for posters/charts
	• Listening to books read aloud
	• Giving oral presentations
	• Listening to oral presentations
Small Group	• Student led discussions
	• Conversations with the teacher to explain choices and students' thinking
	• Learning how to problem solve in social situations
	• Sharing materials
Partner Work	• Conversations with a partner to discuss choices and solutions
	• Orally defending solutions
	• Practice eye contact and respectful listening

Independent Work
• Make choices about solutions
• Think about other perspectives heard and make decisions about possible solutions

Lesson plans would be created by the teacher based on the direction of the students' learning. Sample lesson plans that were created and implemented in a kindergarten class during the months of October and November along with suggestions for the facilitator are included on page 11 of this guide. Because student interests and individual pace of learning guide the creation of each day's plan, the lesson plans included cannot be replicated. Instead, the lesson plans show how each lesson builds upon the outcome of the previous lesson. Suggestions for the facilitator are included to show how decisions are made in the planning and implementing processes in a PBL classroom. Teachers planning to implement PBL write problems to correspond to their students' interests, topics of interest in their class, or themes that are already being taught during the school day. Sample problems were written to correspond to each literacy theme taught during the months of the kindergarten school year in the Evelyn school district. The table below provides the sample problem statements for the year.

Table 2

Sample Problem Statements

Month	Theme	Sample Problem Statement
September	My School	Pretend a new student will be joining our class. What will they

need to know about our school, our classroom, and the people here? What can we do to help a new student?

October	Animals	We need your help! On Friday night, many students and teachers attended the School Fun Fair. When the fair was over, everyone left the school and walked out into the parking lot. It was 9:00 at night and very dark outside. Everyone saw garbage on the ground around the dumpster. A half eaten peach was found in the grass nearby. Many noises were heard as everyone walked to their cars and some people saw yellow, glowing lights in the trees and in the sky. A terrible smell caused people to quickly get in their cars and drive away. One girl yelled that she felt tangled in something. What happens in Evelyn at night? Please help to figure out who or what comes out during the night. Thank you for your help.
November	Friendship	Let's pretend! It is the year 1620 and you are a Pilgrim. You are about to set sail on a ship to a new land. What will you bring with? What will you do when you arrive? Where will you live? Who will help you once you get there? Now pretend you are new to our school. How are you like the Pilgrims? What do you need to bring with you? What will you do when you get here? Who will help you?
December	How do	Look around your classroom and outside. How do things

	Things Move?	move? How do people move? How do animals move? How do plants move? What moves fast? What moves slowly? What moves in water? What sinks? What floats? Experiment and observe to find out how things move.
January	Community	A new neighbor just moved in. They have never been to Evelyn before and they do not know how to find anything. How can you help?
February	The Four Seasons	Your little brother/sister does not know what to wear. How can you help him/her learn what to put on in each of the different seasons? What does he/she need to know about the weather in each season?
March	Who am I?	As you get ready for first grade, start to think about your new teacher. Next year, there will be new and different children in your class. How will you introduce yourself to your teacher? What can you teach your class about you so that they can get to know you better? What can you learn about yourself to help others learn about you?
April	What will I be?	Pretend you are graduating from college! What job would you like to have? Why? What do you need to know to be good at that job? How do you do that job? Where will you go? What will you wear? Who can help you find out more about that job?

Useful Resources for the Facilitator

Teachers using PBL as an instructional technique learn from a variety of resources when writing problem statements and planning activities. Books like Problems as Possibilities: Problem Based Learning for K-12 Education by Torp and Sage and Problem Based Learning in K-8 Classrooms: A Teacher's Guide to Implementation by Lambros can be very for beginning PBL facilitation. The Illinois Math and Science Academy can also be a helpful resource as it provides summer institutes, classroom observations, consultations, and collaboration with other PBL practitioners through an interactive online network. This academy is located at 1500 West Sullivan Road in Aurora, Illinois. Associates can be reached by telephone at (630)907-5957 or by fax at (630)907-5946. More information can be gathered about how the Illinois Math and Science Academy can be of use at http://pbln.imsa.edu/ or by e-mailing dgerdes@imsa.edu. Another useful resource for teacher's implementing PBL is museum-in-a-box artifacts which can be rented and brought into the classroom. Associates can be reached by fax at 519-243-2646 or by e-mailing gwen.watson@county-lambton.on.ca.

Useful Resources for the Learner

Students in a PBL classroom learn from a variety of resources provided by the teacher for discovery learning. Not only do students benefit from learning from their classroom teacher, but they also collaborate with each other and learn from one another. Visual aids including books, posters, and charts displayed around the classroom can also be useful resources for the learner. Trips to the public library, school library, and school computer lab can also prove to be beneficial resources in gathering and presenting information.

Inviting guest speakers into the classroom is another engaging technique to support

learners in a PBL setting. Guest speakers, those considered experts in their field of work,

may include other teachers, staff members in the school, parents, and other community

workers. Field trips may also be planned to visit places in the community and museums

as they relate to the problem. The use of museum-in-a-box artifacts is a unique way to

bring resources into the classroom to promote discovery learning.

Ideas for Grouping Students

There are several ways to group the students to maximize optimal learning in a PBL

classroom. The teacher can group the students according to a seating chart, based on

personalities and behaviors, or to provide a mixture of ability levels in each group.

Groups for students can be named by the teacher or the students. Allowing the students to

name their own group can give them a sense of importance, value, and ownership in the

learning process. When the teacher refers to the groups as teams or squads it can help

students acquire teambuilding skills.

Differentiated Activities

It is important to have activities planned to help all students feel successful reading

and learning about the content. Having books available on a variety of reading levels is

necessary for all students to be able to find information related to the problem. Teachers

should use a variety of visuals like picture books, posters, and charts for students to use

as they learn. It is important to plan lessons that give learners options for drawing,

writing, or giving an oral presentation so all students can use their own strengths and tap

into individual learning preferences. Activities should also be planned to incorporate

different learning settings that allow students to work independently, with a partner, in small groups, and with a whole group so that students can learn how they feel most comfortable.

Helpful Hints for Prompting & Encouraging Thinking

In order to prompt and encourage learners to demonstrate their thinking, facilitators ask specific questions. These questions do not have right or wrong answers. Instead the answers to the questions show the teacher the student's level of understanding. From here, the teacher is able to encourage the learner to investigate further or re-route to find new information. When asking questions, the facilitator should make the learner feel valued and knowledgeable about the content. Helpful phrases are listed in the table below to use with students to make them feel safe when sharing their knowledge and taking risks as a learner.

Phrases for Prompting and Encouraging

➤ I like your thinking. Can you tell me more?

➤ You seem to know a lot about _____. Let's learn about a new topic.

➤ That is very interesting! Where did you learn that?

➤ You should share this information with your group members.

➤ Would you like some help finding new information? I can help you find a partner to begin a new route of discovery.

➤ You must have read a lot about that topic.

‣ Can you tell me why you think that?

‣ Please describe you thinking so that I can understand better.

Technology

Technology can be incorporated into the lessons by having students visit age appropriate websites and allowing students to use the internet to find pictures or photographs that pertain to the content of the problem. Teachers can use power point presentations during whole group and small group work times to help students discover new information. Students can also be guided through the process of creating short power point presentations with pictures and words to demonstrate their solution to the problem. An important role of the facilitator is to model the use of a computer as a resource to find new information as a way of incorporating technology into the lesson plans.

Assessment

PBL facilitators use portfolios to collect any work samples or artifacts gathered during the discovery process to help the learner choose a solution to the problem. Portfolios, along with observations and presentations, are used as a form of assessment as they show the path the learner chose to find a solution. Because PBL focuses on the process of learning rather than the content, the portfolio work samples can be discussed throughout the unit and the learner can explain his or her thinking for choosing the discovery path taken to solve the problem. The use of portfolios also provides the learner with opportunities to defend his or her choices along the way and to challenge their own thinking.

Teacher Reflection and Collaboration

An important role of a PBL teacher is to reflect on what is working and what needs to be revised and improved. Reflection is a useful tool in enhancing instruction. Another critical aspect of teaching using PBL is collaborating with other teachers that use PBL. Sharing ideas through discussions and learning from each other through observations helps to strengthen instruction. A reflection and collaboration table is included below to be completed after implementing lessons and before meeting to collaborate with other teachers. Once this table is completed, it should be kept and used to track progress, changes, and improvements as instruction strengthens.

Table 3

Teacher Reflection & Collaboration

Lesson Topic:	Date:
What worked really well?	What would you like to improve?
Ideas for changing and improving:	Topics to discuss with colleagues:
Things I have tried as a PBL facilitator that have been effective that I would like to share with others:	Questions that I have for my colleagues:

Teacher Survey

The use of a survey can be helpful in providing administration with quarterly feedback on successes and struggles with facilitating PBL. A survey can also be used for the teachers to express what they need as support to strengthen their techniques. The administration can use surveys to find struggling teachers and then allow them to visit

and observe teachers that are feeling more confident during the transition into their new role as facilitators.

Conclusion

  This guide aims to support teachers as they transition into a new role and equip them with a foundation for getting started in their own classrooms. Sample lesson plans, charts, student work, and teacher resources are included. Outside resources are provided as well as emphasis on the importance of teachers collaborating and learning from each other to be successful PBL facilitators. An annotated bibliography is included below to provide resources for further reading on how and why to implement PBL in the classroom.

Annotated Bibliography

Ben-Jacob, M., Talia, G., Ben-Jacob, K., & Levin D.S. (2000). The learning environment of the 21st century. *Educational Technology Review*, Spring-Summer, 8-12.

In this article, the authors stress the importance of teaching our students to be fluent in a technology driven world. This study explains how critical it is for students as young as elementary level, need to prepare for the 21st-century workplace. Other skills are found to be necessary to be successful in the educational world as well as in the workforce are discussed and include collaboration and problem-solving skills.

Bruner, J. (1966). *Toward a theory of instruction*. New York: W.W. Norton & Company, Incorporated.

In this book, Bruner shares a compilation of essays written as he conducted research on development, teaching young children, constructing curricula, and educating teachers. Bruner begins by describing how ideas and theories grow to close gaps in the educational system and as a result, theories of development, knowledge, and instruction link. He moves to redefine education, develop theorems about instruction, and investigate a human being's will to learn. He concludes by exploring the relationship between intellectual development and pedagogy and encourages the reader to take a new look instruction and those things we cannot understand.

Bruner, J. (1985). Models of the learner. *Educational Researcher*, *14*, 5-8.

In this article, Jerome Bruner explores several models of how people learn. He notes that people learn through experience, by making a hypothesis, and by observing experts in the field. Bruner emphasizes that there is not one kind of learning, rather all learners have multiple learning strategies available.

Dewey, J. (1997). *Experience and education*, New York: Touchstone. (Original work published 1938).

John Dewey believed in the idea that there is a strong relationship between experience and education. He emphasizes the need for a sound philosophy of experience in order to prepare children for their responsibilities of the future and overall success in life. In this book, Dr. Dewey describes and analyzes both traditional education and progressive education and finds neither to be adequate as they are lacking a sound philosophy of experience. Dewey views approaches the problems in education in a scientific manner as he investigates and studies the relationship between education and experience.

Fletcher, G. (2007). Curriculum-based reform: An eye on the future. *T.H.E. Journal*, *34*(7), 26.

> This article explains how employers feel the schools are preparing or not preparing the students for the 21st-century workplace. This research shows a need for curriculum reform and new skills to be introduced at all levels of the education system. This study uncovers the gap between skills needed in the workplace and the skills being taught in the schools.

Gullo, D.F. (2006). Teaching and learning in the kindergarten year. Washington D.C.: National Association for the Education of Young Children.

> This book examines the format and recent changes in kindergarten. Kindergarten students are compared to first graders and child development is taken into account as the kindergarten curriculum is dissected. The basics of what should be taught are uncovered as cognitive, emotional, and social skills are incorporated. The second half of the book discusses ways to set up a kindergarten learning environment, implement effective teaching strategies, and identify the most important skills that kindergartners should acquire.

Lambros, A. (2002). *Problem-based learning in K-8 classrooms: A teacher's guide to implementation.* Thousand Oaks, CA: Corwin Press, Inc.
This book gives the reader several definitions and foundations of problem-based learning. Instructions on how to get started, what it looks like, and different types of possible problems to apply are provided for grades K-8. The author gives assessment examples as well as suggestions for integrating problem-based learning and authentic assessments into a curriculum. This book focuses on familiarizing teachers with the philosophy of problem-based learning and it's benefits.

Roh, K., & ERIC Clearinghouse for Science, M. (2003, January 1). *Problem-based learning in mathematics. ERIC Digest.*

> This article describes a learning environment that uses problem-based learning to help students acquire new knowledge as they collaborate to solve a real world problem. This study uncovers the roles of the teachers as they shift from the traditional learning environment. Other aspects such as constructivism and student understanding are discussed as well.

Torp, L., & Sage, S. (1998*). Problems as possibilities: Problem-based learning for K-12 education,* Alexandria, VA: Association for Supervision and Curriculum Development.

This book describes how to apply problem-based learning in elementary, middle, and high school settings. Comments from teachers that have experienced problem-based learning are included. Background information and definitions of terms used in problem-based learning settings are also incorporated in this book. There are directions for implementation for educators as well as ideas for design in making problem-based learning a part of an integrated, meaningful curriculum.

Unit 1 – Nocturnal Animals

The Problem

Note to Facilitator: This is an example of a problem used with kindergarten students. The problem gives clues and leaves room for discovery learning through the use of multiple resources. For example, students need to find out who or what is out at night, why garbage would be around the dumpster, who or what eats fruit, what could the glowing lights be, what caused the smell, and what could have caused the girl to be tangled? The problem is presented in the form of a letter which can spark student interest. It is a letter from the school principal inviting the kindergarten students to help with this problem which gives them a sense of feeling important and valued. The problem was presented to the learners after a school event that took place in the evening which makes the problem relevant to the students.

Dear Kindergarten Students,

    We need your help! On Friday night, many students and teachers attended the School Fun Fair. When the fair was over, everyone left the school and walked out into the parking lot. It was 9:00 at night and very dark outside. Everyone saw garbage on the ground around the dumpster. A half eaten peach was found in the grass nearby. Many noises were heard as everyone walked to their cars and some people saw yellow, glowing lights in the trees and in the sky. A terrible smell caused people to quickly get in their cars and drive away. One girl yelled that she felt tangled in something. What happens in Evelyn at night? Please help to figure out who or what comes out during the night. Thank you for your help.

Sincerely,
Your Principal

Unit 1 – Nocturnal Animals

Possible Learning Directions

Nocturnal Animals

Animal Survival

Day and Night differences

Animal Sounds

Possible Directions

Telling Time – Determining what time it is light or dark

Nocturnal Animal Behaviors

5 Senses

Unit 1 – Nocturnal Animals

Lesson Plans

Note to Facilitator: These lesson plans are a sample of what one facilitator did to guide her learners through finding solutions to the above mentioned problem. Because students' discoveries drive the direction and pace of the lessons, these lessons cannot be exactly replicated. These lessons are included as a sample to guide and support teachers in their own planning and implementing of PBL units. Although the lessons may vary from one classroom to another, the active role of the facilitator remains constant. As a guide and a supporter to the learners, the facilitator will plan lessons based on the previous lesson's direction, model appropriate and effective behaviors for learning in a collaborative atmosphere, and immerse the students in a rich and safe learning environment.

Day 1		

Materials Needed:
    The Problem Statement
    Chart 1 – "Problem Solving"
    Markers for paper chart
    Magnetic Strips
    Dry erase marker for magnetic strips
    Chart 2 – "Working Together"
	Reminders:
	-Begin calling the students "problem solvers."
	-Have photos taken of squads to display in the room.
	-Have photos taken of squads "working together" to display on Chart 2.
		After writing each lesson, include the materials you will need to have prepared. Charts are prepared ahead of time with the titles only. Reminders for the facilitator are listed for these plans as well.

Whole group on the carpet: - Read the problem statement to the problem solvers. - Begin referring to the students as problem solvers. Emphasize how their help is needed to solve this problem. - Begin filling in facts on Chart 1. Have problem solvers recall information given in the problem statement to complete the facts section. Teacher records facts on chart. - Teacher will facilitate a discussion on what else the problem solvers need to know to begin filling in the need to know portion on Chart 1. - Explain that Chart 1 will be used throughout the weeks as they work to find a possible solution. - Explain that not everyone will have the same answer. Everyone will be working to find a possible answer. As long as they can explain why they chose their possible solution, all answers will be correct. - Explain how everyone will be working in squads or groups. Each squad will have 4-6 problem solvers. Each squad will have a color name (ex: red squad). Use colored		The lesson plans include different instructional and learning settings. The first day of a unit usually consists of whole group time to present the problem and begin completing the charts. Sample charts are included in Appendix A. After students are broken into groups, small group time begins. The students are referred to as problem solvers to reiterate their importance

magnetic strips to record the names of each problem solver. Post the magnets on the board so everyone can see which squad they are in. Squad Work on the carpet: • Have problem solvers sit with their squads on the carpet. Tell problem solvers that you are going to give them a few minutes to talk with their squad members to come up with good ideas for how to work together. Squad discussions will be called "RAP Sessions." R – Respecting, A – All, P – Problem solvers. Choose one squad to model a RAP session where respectful speaking and listening take place and everyone has a turn to talk. Teacher will walk around and listen to the squads in their RAP Sessions. Teacher can guide RAP Sessions for squads that are struggling. Regain attention from squads. • Have problem solvers offer ideas from their squad RAP Sessions to begin Chart 2. Teacher will chart student ideas for how they should work together. Teacher will guide whole group discussion to help problem solvers understand how to effectively work with one another.	in solving the problem. The learners should be immersed in the vocabulary. As the facilitator uses words and phrases like problem solver, solution, and resources, he or she should point out what these are in the classroom and on the charts. The small groups are called squads and were given colors for squad names. Photos of the students with their squads are displayed in the classroom. This helps with teambuilding experiences. Students' names are also displayed on color coordinated magnet strips so that everyone knows who belongs in which squad. The discussions held during squad meetings are called RAP sessions. R stands for respecting, A stands for all, and P stands for problem solvers. This is just another way to reinforce respectful communication during collaborative work times. A small poster is hung in the classroom to remind students of the meaning of the RAP sessions. See Appendix E for sample poster.

Day 2

Materials Needed:	*Reminders:*
The Problem Statement Chart 1 – "Problem Solving" Markers Chart 2 – "Working Together" Post it notes Resource books, magazines, posters, pictures Chart 3 – "Our Discoveries"	-Remember to call the students "problem solvers." -Have resources available for possible solutions. -Have post it notes and markers nearby when doing the read aloud.

The charts should be hanging and visible to the problem solvers at all times. The charts listed under materials needed will be added to or reviewed during each lesson.

Whole group on the carpet:
- Review problem statement.
- Review facts and need to know information from Chart 1 – "Problem Solving."
- Tell the problem solvers that today they will begin thinking of possible solutions based on the facts that they have. Tell them to first think on their own of what ideas they might have.
- Review Chart 2 – "Working Together." Discuss the expected classroom volume. Discuss how problem solvers that work together listen to each other and take turns talking. Have one squad model a RAP Session and then point out what they did really well to the rest of the class.

Squad work on the carpet:
- Allow squads to meet to begin discussing possible solutions. Teacher will walk around and listen to different RAP Sessions. Teacher can guide squads that are having difficulty getting started.
- Invite the squads to meet on the carpet to discuss a few possible solutions.

Whole group on the carpet:
- Have one representative from each squad share one idea and try to share one reason why the squad thought of that solution. Teacher should write each possible solution on a post it note and post it on Chart 1 – "Problem Solving" in the possible solutions section.
- Teacher can bring out books and magazines to display for any possible solutions that were posted. For example, if one of the squads mentioned a raccoon, then the teacher could display raccoon resources (books, magazines, posters, pictures, etc.) for further exploration.
- The teacher may choose a book to read aloud to the problem solvers at this time. The teacher will explain how the problem solvers should be listening for facts that relate to the problem and help them think of possible solutions. Teacher will explain how if they learn something new from the read aloud, they should raise their hand and wait

This lesson uses whole group instruction followed by collaborative work time with squads and then time for squads to share in a whole group setting again.

The charts are referred to on a daily basis to remind students of what they are working towards.

During RAP sessions, the facilitator joins the squads to listen, observe, and guide them as they begin their discussion.

It is important to have many resources available to pull out as students discover new information. Displaying all resources in the beginning of the unit may hinder the actual discovering of new information. Let the students add possible

to be called on to share what they learned. Teacher will explain process of recording new learning on post it notes and problem solvers hanging the new learning on Chart 3 – "Our Discoveries." During the read aloud, if problem solvers begin making discoveries based on the information they hear, the teacher should stop and write their discovery on a post it note. The problem solver should then write his/her name on the post it note and post it on Chart 3 – "Our Discoveries."	solutions and then provide materials for further investigation.

Day 3		

Materials Needed:
     The Problem Statement
     Chart 1 – "Problem Solving"
     Markers
     Chart 2 – "Working Together"
     Posters
     Glue
     Teacher notes, pen
	Reminders:
	-Remember to call the students "problem solvers."
	-Write the words "day" and "night" on the board.
	-Have posters with a line drawn on them, glue, and markers readily available at the tables.
	-Teacher needs paper and pen to write down positive "working together" behaviors as she circulates.
		During this lesson, the faciliator will have the opportunity to notice and record appropriate collaborative behaviors. These behaviors can then be shared with the problem solvers to reinforce the ideas of working together.

Whole group on the carpet:

- Review problem statement.
- Review facts and need to know information from Chart 1 – "Problem Solving."
- Teacher will call attention to the fact in the problem statement that the events happened at night. If this is mentioned on Chart 1 – "Problem Solving" in the need to know area, the teacher should point that out now. The problem solvers need to begin thinking about the importance of the events occurring during the nighttime. Teacher will facilitate a discussion to prompt problem solvers to begin thinking of the differences between daytime and nighttime. Begin having problem solvers recognize that daytime is different from nighttime.
- Teacher will explain that the squads will be working together (point out Chart 2 – "Working Together") to make posters to show the differences between day and night. Teacher will ask one squad to model appropriate squad behaviors for working at the table and sharing supplies. Teacher can model how to politely ask for a certain supply or to request help while working. Additions can be made to Chart 2 – "Working Together" to remind problem solvers of how to speak to each other and how to work together effectively.

Squad work at the tables:

- Each squad will go to a table. Each table has a poster with a line drawn the middle, markers, a picture of a sun, and a picture of moon. The teacher will direct the squads to glue the picture of the sun at the top of the left column and glue the picture of the moon on the top of the right column. The words "day" and "night" will be written on the board for problem solvers to copy under the appropriate column. The squads will work together to write words and draw illustrations of what they know about daytime and nighttime. The teacher will walk

During the previous lesson, problem solvers began discussing how the problem occurred at night. In order to guide students' learning, the facilitator plans an activity to help problem solvers differentiate between what is out during the day and what is out during the night. Lessons are planned on a daily basis based on the previous day's lesson and students' discoveries.

During this lesson, whole group instruction is used to review the problem and explain the squad work. The facilitator will circulate the room during squad work time to visit with and guide problem solvers. The squads then have the opportunity to present their posters during whole group time at the conclusion of the lesson. Sample posters are included in Appendix B.

around to listen to conversations and guide squads that are struggling to get started. The teacher will make a note of at least one positive behavior from each squad as she circulates the room. Whole group on the carpet: • Invite all squads to meet back on the carpet and to bring their posters. Teacher will explain that each squad will have the opportunity to share and present their poster with the rest of the class. Teacher will ask one squad to model how problem solvers should sit quietly and listen to presentations. Teacher will explain that each problem solver must share at least one thing during the presentations. • Each squad presents their poster to the rest of the class. After each presentation the teacher tells the squad what she noticed them doing well as they worked together to make and present their poster. Posters should be displayed in classroom. • The teacher explains how the presence of the sun lights up the sky. She reminds problem solvers of what she heard during presentations of what can be seen during the day and during the night. She reminds the problem solvers that the problem that occurred happened at night and that they should focus on what they just discovered happens during the nighttime. Discuss how during the night, the sun is not out and therefore it is dark outside. • Teacher will tell problem solvers that tomorrow they will pay attention to when it is light outside and dark outside so that they can figure more out about this problem that needs to be solved.	Before any presentations begin, the facilitator chooses a squad to model respectful listening during the presentations. The modeling process is repeated throughout the unit. Positive working together behaviors are shared with each squad by the facilitator after their presentations to reinforce appropriate collaborative behaviors. The facilitator uses the time between the presentations as teaching points to guide problem solvers further through discriminating between night and day.

Day 4		

Materials Needed:
    The Problem Statement
    Chart 1 – "Problem Solving"
    Markers for paper chart
    Chart 2 – "Working Together"
    Student posters
    Student chart
    Pocket chart with 13 pockets
    Yellow and black squares of construction paper
    Cards with clocks showing the hour
    Index cards with times to the hour written
        digitally
    Teacher notes, pen
    Resources (books, magazines, posters, pictures)
    Large clock
    Small clocks
	Reminders:
	-Remember to call the students "problem solvers."
	-Send student charts home today to be completed.
	-Prepare pocket chart with clock cards, digital time cards, and construction paper squares.
	-Remember to take notes during RAP sessions.
	-Remember to model RAP session.
	-Remember to have clocks ready at whole group meeting on the carpet.
		Modeling is a critical component of using PBL. Because students are trying to get acquainted with this nontraditional way of learning or because this is their first educational experience as kindergarten students, what is expected needs to be modeled so that the problem solvers can visualize what behaviors they should be demonstrating.

Whole group on the carpet:
- Review the problem statement.
- Review Chart 1 – "Problem Solving."
- Review posters from yesterday and remind problem solvers of a few daytime and nighttime items on the posters. Focus on the nighttime side of the posters and discuss how the sun is not out at night to light up the sky. Throughout the day, problem solvers will be charting the presence of the sun each hour, on the hour.
- Use a clock to show how to tell time to the hour. Point out the hands of the clock and practice showing different times and having problem solvers call out what time the clock shows. Ask one squad to model how to sit, share a clock, pass the clock, and wait their turn.

Squad work on the carpet:
- Ask squads to sit in a circle to pass around a small clock and to take turns making different times to the hour. Allow problem solvers to move the hands and make different times with their squads. Collect clocks.

Whole group on the carpet:
- Go back to the time cards on the pocket chart to see at what times so far today it was light outside or dark outside. The chart will be sent home to be complete during the evening and night hours.
- The teacher will draw attention to the pocket chart that matches the student charts where a visual has been created

This lesson includes three different whole group sessions and two different small group sessions. The facilitator noticed in the previous lessons that the problem solvers were becoming restless when whole group instruction lasted too long and off task when small group work time lasted too long. The decision was made to shorten the sessions and increase the number of sessions to keep problem solvers moving and attentive.

After learning about day and night, the direction for this unit turned to telling time to determine at what time it gets dark outside. Individual

using yellow and black square pieces of construction paper to show if it is light outside or dark outside at each hour of the school day. Every hour the pocket chart will be visited.

- Review the possible solutions on Chart 1 – "Problem Solving." Look for things to rule out because they are not out at night. Explain that the squads will have a few minutes to meet and come up with a new solution since they know it has to be something that is out when it is dark outside. Have one squad model appropriate behaviors for having a RAP Session – taking turns talking, listening to each other, and giving everyone a chance to speak. Make additions to Chart 2 – "Working Together" if necessary.

Squad work on the carpet:

- Ask squads to meet to discuss any new possible solutions. Also ask squads if there is a possible solution on Chart 1 – "Problem Solving" that does not belong and should be ruled out. Teacher will circulate to listen to different discussions and take note of positive behaviors displayed while working together.

Whole group on the carpet:

- Regain attention from all squads. Have one representative from each squad share a new possible solution. Squads may also share if they think a possible solution needs to be ruled out and explain why. Teacher will share the positive behaviors observed while she circulated after each squad shares.
- Try to put the possible solutions from Chart 1 – "Problem Solving" into groups (people, animals, etc.). Move the post it notes around to form groups. Revisit the problem statement and see which group matches the facts from the problem statement best. For example: Could people have thrown garbage down around the dumpster? Could people have caused the glowing lights? Could a person have caused the girl to get tangled up? Could animals have thrown garbage down around the dumpster? Could animals have caused the glowing lights? Could an animal have caused the girl to get tangled up? Which group makes the most sense to fit this problem?
- Begin talking about animals. Direct the discussion to include animals that are out at night. Explain to the problem solvers that they are going to begin researching and learning more about animals that are out at night to determine what could have done this at our School?
- Revisit Chart 1 –"Problem Solving" to see if anything needs to be added to the needs to know section. Remind problem solvers that we already know that the sun was not out and that it is dark out at night. Guide research towards animals that are out at night.

student clocks were used to practice moving the hands on the clock and telling time to the hour.

The next activity involved a chart to be made partially during the school day and completed at home with parental support to determine whether it is a light or dark at each hour of the day. A pocket chart was displayed in the classroom as a model to help problem solvers as they filled in their own charts.

Because students had been discovering different components of the problem like night versus day and telling time to the hour, they were able to revisit their charts to add new possible solutions or rule out previous possible solutions. Problem solvers first met with their squads to discuss the possibility of adding or taking off solutions while explaining their reasoning and then shared in a whole group setting.

The facilitator guided the learners by asking questions as she visited each of the possible solutions on the class chart.

A discussion about animals takes place which means that the facilitator needs to

• Display books, magazines, posters, and pictures of animals around the room.	gather resources to display around the classroom about animals so that problem solvers can investigate further.

Day 5		

Materials Needed:
   The Problem Statement
   Chart 1 – "Problem Solving"
   Markers
   Chart 2 – "Working
Together"
   Student chart
   Pocket chart with 13 pockets
   Yellow and black squares of
construction paper
   Cards with clocks showing
the hour
   Index cards with times to the
hour written
    digitally
   Teacher notes, pen
   Resources (books,
magazines, posters, pictures)
   Large clock
   Problem Solver Portfolios
   Post it notes
   Chart 3 – "Our Discoveries"
	Reminders:
	-Remember to call the students
	"problem solvers."
	-Remember to take notes
	during RAP sessions.
	-Remember to model RAP
	session.
	-Remember to have post it
	notes and markers nearby
	during read aloud.
	-Remember to pass out
	Problem Solver Portfolios.
	-Remember to collect all
	Problem Solver Portfolios.
		Problem solver portfolios are introduced during this lesson. PBL uses portfolios to collect student artifacts during each unit. The students include all independent and small group work artifacts as well as any other pictures or pieces of information that aid in uncovering possible solutions. The portfolios are stored in the classroom and accessible to the problem solvers as needed. A cover sheet for the portfolios is included in Appendix F.

Whole group on the carpet:
- Review the problem statement.
- Review Chart 1 – "Problem Solving." Focus on how the problem is situated in the nighttime.
- Ask problem solvers to bring the lightness and darkness charts to the carpet. Use the information they gathered to completely fill in the pocket chart with yellow and black squares to show what times of day are light and what times are dark. Emphasize that whatever did this at our school was out after (7:00 or whenever you have displayed your first black card on the pocket chart).
- Using a clock, move the hands to practice telling time to each hour and having problem solvers tell whether it was light or dark at that time.
- Give each problem solver a folder. These folders are called "Problem Solver Portfolios." This is where they will store any charts, information, pictures, or research they collect. Have each problem solver place their chart in their portfolio. Collect the portfolios.
- Redirect problem solvers' attention to Chart 1 – "Problem Solving" to look at the groupings in the possible solutions section. Focus on the animals. Have students begin to think about what animals would be out after dark.

Squad work spread out around the room:
- Explain that the problem solvers will now have

The different concepts learned during previous lessons are often revisited and reinforced.

Here the problem solvers

opportunities to explore different animals using the resources in the classroom. Have each squad sit together somewhere in the classroom where they can be alone with their squad members. Have one squad member choose a few resources from around the room to bring back to their squad. Have one squad model how they will share the resources, treat the resources with respect, and respect each other. Add to Chart 2 – "Working Together" if necessary. Explain that they can have RAP sessions with their squad members about animals they are learning about as they look through the resources. Teacher will circulate to take note of positive behaviors. Whole group on the carpet: • Meet as a whole group. Teacher will share positive behaviors noted as problem solvers worked together. Ask if any problem solvers would like to add a possible solution to Chart 1 – "Problem Solving" or rule out a possible solution. • Teacher will read aloud <u>Animals of the Night</u> by Merry Banks. Problem solvers can make discoveries and add post it notes to Chart 3 – "Our Discoveries" throughout the read aloud.	are given the opportunity to choose resources that match their thinking and investigate with their squads. One squad is asked to model appropriate and respectful behaviors for small group time. The facilitator circulates to note behaviors that can be shared to highlight positive collaborative occurrences. During a read aloud, the problem solvers get to share discoveries as they make them and ask questions to demonstrate their thinking.

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Day 6		
Materials Needed: The Problem Statement Chart 1 – "Problem Solving" Chart 2 – "Working Together" Books and magazines	*Reminders:* -Remember to model everything before allowing the problem solvers to practice the skill. -Remember to focus on the positive behaviors and skills. - Remember to have high expectations. They will rise to meet you.	This lesson focused on student collaboration. The use of modeling was important here as students are still learning effective communication skills which are necessary for collaboration. The teacher pointed to her own eyes, ears, and mouth to create a visual for what the problem solvers should look like for effective listening during whole group instruction. The teacher also raised her own hand when giving reminders about raising hands before sharing to again provide a visual.

Whole group meeting on the carpet :
- Ask problem solvers to sit on the carpet, eyes on the speaker (teacher), ears open for listening, mouths closed. Point out 1 or 2 problem solvers that are modeling these behaviors. Remind class of the importance of looking at the speaker and listening respectfully.
- Ask problem solvers to share what they remember about the problem. Remind problem solvers of procedures for raising their hand and waiting to be called on to share. Have them explain one at a time what happened on the night of the School Fun Fair. Choose 3 or 4 problem solvers to share. Thank them for raising their hand and waiting to be called on.
- Reread the problem as a reminder.
- Review the possible solutions on the Problem Solving chart. Point out the animals that have been mentioned thus far.
- Explain to problem solvers that they will be looking through books and magazines today about animals that come out at night with their squad members. Have books available on the animals that are listed under possible solutions on the Problem Solving chart.
- Review working together chart. Emphasize the importance of sharing the materials and speaking respectfully to one another about the animals.
- Explain that when you clap 2 times, the problem solvers should stop what they are doing and clap 2 times and turn to look at you quietly. Practice this once or twice.

Squad work time:
- Arrange squads around the room with materials about animals that come out at night.
- Without giving any further directions, allow problem solvers to begin exploring the different materials, working together, sharing, and talking about the animals.
- Circulate to spend time with each squad for a few minutes. Try not to join the conversation. Just listen to what they have to say about animals or sharing. If they are not talking about animals or how to work together you may

A key element of teaching communication and collaboration is modeling respect and politeness. Without drawing attention to it, the teacher is constantly modeling the appropriate way to speak and respond to others. While students are sharing, the teacher is attentively listening and not being distracted by other student behaviors. Addressing student behaviors is handled after listening and responding to the student speaking. After

redirect their conversations.
- This time is for the problem solvers to work together and to look through the different materials to see different pictures of animals at night.
- Teacher – claps 2 times. If problem solvers clap 2 times begin giving the next direction. If they do not clap 2 times, continue until they do.
- Show problem solvers where to drop off their materials as they walk back to their seats.

Whole group review at their tables:
- Review the positive behaviors you noted as you circulated around the room.
- Mention the exemplary discussion topics you heard as you circulated.
- Mention one more time the names of different animals that the problem solvers explored in their squads from the possible solutions.

a student shares, the teacher always thanks that student for raising their hand and for sharing their own knowledge or asking a question.

In this lesson, the teacher implements a classroom management strategy of clapping her hands to get the students' attention. She first explains how to do this and then the class practices before the activity begins. This is another way that the teacher uses modeling.

This lesson's main focus was collaboration. Students were working together in their squads and the teacher was listening for discussions about their discoveries. Not only was she listening to hear what they were learning, but she was listening to hear how they were sharing and communicating with each other.

At the end of the lesson, after the teacher circulated and met with each of the squads, she highlights the positive aspects of the discussions she overheard. This helps students to feel confident about their learning. It also helps those that are struggling to hear reminders about what they could do next time to improve.

Day 7		

Materials Needed:
     The Problem Statement
     Chart 2 – "Working Together"
     Blank drawing paper
     Markers, crayons, colored pencils
     Chart 4 – "Our Senses"
     Problem Solver Portfolios
     CD player
     CD with animal sounds
	Reminders:
	 -Remember to draw chart before starting the lesson.
	 -Remember to have CD ready in the CD player before the lesson.
	 -Remember to model everything before practicing any skill.
	 -Remember to focus on positive behavior.
		This unit is focusing on nocturnal animals and animal needs. So far several other content areas have been introduced including day and night, light and dark, and telling time to the hour. During this lesson, the five senses are introduced as well as animal sounds. The teacher was able to introduce new content as she felt the students had a strong understanding of the previous topics. The students' understanding and interests drive the pace of the lessons but the facilitator guides them down the routes that will lead to opportunities for discovering possible solutions to the problem presented.

Whole group meeting on the carpet: • Explain to class that problem solvers use their senses to solve problems. Go over the five senses (sight, smell, sound, touch, taste). Review the problem and stop after each line to see if the problem solvers notice anything mentioned in the problem that involves the senses. • Fill in Chart 4 – "Our Senses" (you can use white board on easel for this chart) with what the problem solvers say they heard in the problem to match each sense. Squad work time at tables: • Send squads to their tables. Each problem solver should have a piece of blank paper and drawing supplies. • Problem solvers will listen to sound clips and draw who or what they think makes those sounds. • Teacher will explain that each problem solver will have a chance to share what they drew with their squad. Revisit the Working Together chart to remind students of how they should look at the speaker, listen to the speaker respectfully, and take turns talking. Teacher will explain how problem solvers will clap two times when the teacher claps twice and turn to look quietly at the teacher. • Problem solvers will share what they drew with their squad members at their tables. Each child will say what they drew while the other members listen and wait their turn quietly to share. • Teacher will circulate quickly to listen to one or two children at each table. • Teacher will clap two times and problem solvers will clap two times back. (do this until all students' attention has been captured) • Teacher will announce to the class the different animal names she overheard while circulating. Teacher will point out two different positive behaviors from squads while they were working together. • If time permits: problem solvers can try to label their drawings with animal names. Teacher can write animal		During this lesson, the facilitator has sound clips of animal sounds for the problem solvers to listen to. This is an example of the type of resources that the facilitator makes available for experiencing learning and using the senses to connect to learning.

names on the board and problem solvers can copy them next to their pictures. These drawings go in Problem Solver Portfolios.	The teacher practices and implements the new classroom management strategy of clapping her hands again during this lesson. Instead of having the problem solvers share what they heard in a whole group setting, the facilitator chooses to have them share within their squads. This decision was made so that all problem solvers have the opportunity to share and be heard by other squad members. If this activity were done in a whole group setting, fewer problem solvers would be able to share because it would be difficult to hold everyone's attention during a sharing session that lasted for an extended period of time and was possibly repetitive.

Day 8		

Materials Needed:
    The Problem Statement
    Chart 1 – "Problem Solving"
    Chart 2 – "Working Together"
    Chart 3 – " Our Discoveries"
    Teacher notes, pen
    Resources – books for read aloud
	Reminders:
	-Remember to model all skills before having problem solvers practice the skills.
	-Remember to guide the learners but let them do their own thinking and discovering.
	-Remember to focus on the positive behaviors and emphasize the communication skills – listening and speaking.	

Whole group meeting on carpet:
- Teacher will review with the problem solvers the animals that were drawn yesterday.
- Revisit problem solving chart to review possible solutions. Go through each possible solution and determine whether the solution should be ruled in or ruled out as a possible solution now that they have more information.
- Remind students of the sounds they listened to yesterday. Explain that today they will focus on the sense of sight. Remind class of how to sit quietly, listen to the speaker, look at the speaker, and raise their hand to share an idea. Ask one child to model this. Ask "What did the people see the night of the Fun Fair?" (garbage on the ground, half eaten peach, yellow glowing lights)
- Guide problem solvers down the path of determining who or what could have put garbage on the ground, who or what eats peaches, and who or what could have caused yellow glowing lights at night? (raccoons and opossums in the garbage, bats and raccoons eat fruit, owl eyes or fireflies causing lights) If any of these are mentioned, make sure to add them to the possible solutions on the Problem Solving chart.
- Choose a book to read or show pictures to the class based on one of the possible solutions.
- Remind problem solvers of the procedures for sharing a new discovery as they learn - If anyone learns something new, they can raise their hand to share a discovery. Discoveries should be added to chart 3 – Our Discoveries.

Squad work time:
- Squads will meet at their tables to have a RAP session. Remind squads that RAP means that they will respectfully talk to each other and listen to each other. Revisit Working Together chart to review. Each problem solver will have the chance to say "I think it was a _____ because _____."
- Remind problem solvers of how to sit quietly at their

As problem solvers begin making discoveries, the facilitator redirects their attention back to the problem and reviews what they know and what questions they still have. The process of ruling in and ruling out possible solutions continues and is guided by the facilitator. Problem solvers can only rule in or rule out a possible solution with agreement from their squad members and an explanation to the facilitator. The facilitator will not persuade problem solvers against their decision as long as it is well defended. In a kindergarten classroom, a strong defense includes proof from a picture book or poster in the classroom or the sharing of facts learned during discussions or books read aloud.

The facilitator provided a sentence with blanks for the problem solvers to fill in as they discussed possible solutions. This was done to help keep

tables, take turns talking, and listen respectfully to each other. • Have one squad model how this should look. • Teacher will circulate and note positive behaviors and effective communicating as problem solvers work on speaking and listening to one another.	conversations focused and so that those listening could attend as they knew what to expect was going to be shared. This style of communicating also allowed everyone to have a chance to share and defend their choice. As squad members share, the idea is to have the opportunity for problem solvers to possibly change their own mind as they listen to evidence presented by classmates. Modeling is used again during this lesson. This time the facilitator asks a squad to show the rest of the class how to communicate respectfully. Respectful communication is being taught in every lesson and being modeled in different ways. The reason for this is that certain learners may develop the skill by watching the teacher or students while others will learn the skill by practicing it for their class. Being chosen to model the skill may also help to build confidence in learners and reinforce that they are doing things correctly.

Day 9		

Materials Needed:
    The Problem Statement
    Chart 1 – "Problem Solving"
    Chart 4 – "Our Senses"
	Reminders:
	-It might be helpful to have the shades drawn before the lesson begins.
	-Have a few small items available in the dark corner of the room to hold up during the Problem Solver Activity #2.
	-Remember to model all RAP sessions before allowing problem solvers to begin discussing.
		An important role of the facilitator in a PBL classroom is to provide opportunities for authentic, unique, and meaningful learning experiences. In this lesson, the facilitator provides learners with lessons that allow for experiencing the use of their own senses to better understand how nocturnal animals use their senses.

Whole Group:
- Ask problem solvers to sit on the carpet in their squads. Point out squads that are sitting quietly, listening to the speaker, and that are ready to get started.
- Talk about how last week animals were ruled in as possible solutions and other things were ruled out as possible solutions. Have problem solvers offer names of animals that were ruled in or that are still being considered as possible solutions. Refer to the problem solving Chart – Chart 1.
- Begin using the word "nocturnal" to describe animals that are awake during the night and asleep during the day. Explain that nocturnal animals are active during the night. Relate being active at night to the mess found at night time at school after the fun fair.
- Review how the problem solvers discovered that it is dark out at night and light during the day. Ask the problem solvers to begin thinking about how these nocturnal animals can be active when it is dark outside.

Squad Work:
- Ask one squad to model how to turn and face each other for a RAP session. Point out what the members of the squad are doing well.
- Ask each squad to turn to engage in a RAP session to discuss how they think nocturnal animals can be active in the dark.
- Squads face each other and take turns talking to discuss how nocturnal animals can see, hear, and find food in the dark of the night. Teacher circulates to note effective communication skills – Are the problem solvers listening to each other? Is one problem solver speaking at a time? Are the squad members looking at the person talking?
- Clap two times indicating that the problem solvers should stop what they are doing and clap two times in response, turn and face the teacher.

The purpose of whole group meetings is to review expected behaviors, provide reminders to guide direction of learning, introduce new activities, and share findings discovered during small group work time.

The purpose of squad work, or small group work time, is to allow students time to direct their own learning. Students participate in student lead discussions, use resources to make discoveries, and prepare presentations to share with the class. The facilitator uses this time to meet with individual students and small groups of students. The purpose of these meetings is to provide the

Whole Group:	facilitator with students' understanding with a smaller number of students. Another purpose of this time is for students to use the teacher as a resource if assistance is needed on how to find information.
• Ask one member from each squad to share one idea that they heard during the RAP session about how nocturnal animals can be active in the dark. If you hear problem solvers mentioning that the nocturnal animals would use their senses, call attention to and emphasize that the animals are using their senses.	
• Refer to Chart 4 – "Our Senses." Discuss how nocturnal animals have to use their senses just like we use our senses to see, hear, taste, touch, and smell.	This lesson includes two activities where the students are participating as individuals rather than group members. Although this activity is conducted as a whole group, each individual learner makes decisions and comes to conclusions based on their own thinking.
Problem Solver Activity #1 at their tables:	
• Turn off the classroom lights and pull down the shades. Ask the problem solvers to cover their eyes. Teacher will make noises with classroom objects (ex: sharpen a pencil, slam the door, drop a book, write on the board). Problem solvers will listen without looking. Problem solvers will raise their hands to offer their ideas for what the sound is after each sound is made. The teacher will call on students to share with the class.	
• Talk about how even though they couldn't see, they could use their sense of hearing to figure out what was going on in the dark. Relate this to how nocturnal animals use their strong sense of hearing to find food and escape danger in the dark.	
Problem Solver Activity #2 at their tables:	
• Keep the lights off and the shades drawn. Stand in a far corner of the room where it is especially dark and hold up different items (crayon, paper clip, paint brush) for the problem solvers to see. Call on problem solvers to name the items that you hold up if they can see them in the dark.	
• Turn the lights on and show them the items. Talk about how nocturnal animals have to use their night vision to see in the dark. Explain that nocturnal animals have such a strong sense of sight in the dark that they can see about as well as humans can see in the light.	
Squad Work:	
• Ask problem solvers to have a RAP session with their squad members to discuss how the nocturnal animals in Evelyn could see and hear in the dark on the night of the fun fair.	
• Teacher will circulate to listen to the different ideas.	

Day 10		
Materials Needed: "Animals of the Night" class set of magazines	*Reminders:* -Have the magazines readily available to hand out during whole group time. -Remember to use word "resource" and explain how resources help us to find new information.	An important concept of PBL is using many different resources to discover information. During this lesson, the facilitator uses a class set of magazines as a new resource for learning.
Whole Group at tables: • Teacher will explain that problem solvers need to use lots of different resources to discover a solution to a problem. So far the problem solvers should have been exposed to books, posters, charts, their own ideas, their squad members' ideas, and their own senses. • Share the "Animals of the Night" magazine with the class. Allow them time to look through the magazine to see the pictures and find nocturnal animals they have been learning about. • Teacher will read each of the four pages of the magazine aloud to the class as they follow along. • Teacher will explain how magazines can be a resource too when making discoveries about nocturnal animals. • Problem solvers will be asked if there are any other resources that they can think of that can help them to find information. Teacher will call on one problem solver at a time to share. Remind class to turn and face the person speaking. *If a problem solver mentions the library, teacher will stress how the library is such a good resource for finding information. • Teacher will talk about how the library is a good place to find information. Whole Group Activity: • The class will visit the school library where the librarian has pulled many different resources about nocturnal animals. • Problem solvers will have the opportunity to look through different books and magazines about nocturnal animals. • Problem solvers will also have the opportunity to check out books to take home and share with their families.		The facilitator has the responsibility to introduce new resources to the learners. Not only does the facilitator provide a class set of magazines from the school library, but she also explains how magazines are used and makes the magazines purposeful in the students' endeavor to uncover possible solutions. For this lesson, the facilitator asked the librarian to pull books about nocturnal animals and set them aside for the students. Because the students are in kindergarten, the emphasis is on showing another place to find valuable resources rather than on teaching students how to find books in a library. If this class were given another opportunity to visit the

| | school library, the next lesson would focus on how to find books on topics of interest on the shelves. |
| | Taking the library books home to share with students' families is important in this lesson as well. Giving the students the opportunity to teach their family members what they have learned and use resources to make discoveries at home is another responsibility of the facilitator. This shows the students that learning occurs in different settings. It also gives the students a sense of value and importance as they demonstrate their own learning for their family members. |

Day 11		

Materials Needed:
    Chart 1 – "Problem Solving"
    Post-it notes
    Markers
	Reminders:
	- Ask the computer lab technician to have the web page up and running on all computers before the class arrives.
		Another responsibility of the facilitator is to provide opportunities for students to learn using technology as a resource. During this lesson, the class visits the computer lab where each student has the opportunity to use a computer and navigate through a web site to learn more about nocturnal animals.

Whole Group on the carpet:
- Discuss how yesterday the problem solvers were able to use the library to find new resources to learn about nocturnal animals.
- Refer to Chart 1 – Problem Solving. Look at the "Need to Know" section of this chart. Read each question aloud to the class. If the question has been answered through their learning, write the answer on the chart or on a post-it note next to the question. Discuss what resources were used to find the answer to what they needed to know.
- Explain that the library is a valuable resource with lots of good information. Tell the problem solvers that our school has another place that is a resource for learning new things. Call on one or two problem solvers to share what they think that place might be. Explain how the computer lab has computers that are full of information for learning new information.

Whole Group Activity:
- The class will visit the school computer lab. Each problem solver will sit at a computer. Every computer will have the following web page opened and ready for navigation: www.sheppardsoftware.com/.../**animals**/.../seekandfind**nocturnal**.htm.
- The teacher will instruct the problem solvers on how to use their mouse to click on different animals.
- Problem solvers will use this time to look for and identify different nocturnal animals. The classroom teacher, researcher, computer lab technician, and reading teacher will be circulating to help problem solvers use the computers and to have short discussions about where the nocturnal animals are hiding in the picture.

The facilitator is showing the students that there are many places in a school to find information. Not only are the students learning content, but they are also acquiring technological skills as they learn to use a computer.

As the facilitator, it is important to build professional relationships with other staff members in the school as you will need to call on them for support. In the previous lesson, the librarian was called upon to help. During this lesson the facilitator requested assistance from the computer lab technician. Because the teacher implementing these lessons had built a professional relationship with a sixth grade teacher, sixth grade students were

	able to visit the computer lab to help the kindergarten students learn to move the mouse and click on the pictures of the nocturnal animals. The reading teacher also volunteered to be present during this lesson in case students needed extra assistance.

Day 12		

Materials Needed:
  The Problem Statement
  Chart 1 – "Problem Solving"
  Pocket Chart
  Index cards
  Pencils at each table
	Reminders:
	-Remember to stress how there are no wrong answers.
	-Remember to stress the importance of explaining **why** you agree with a possible solution.
		During this lesson, the students are deciding on possible final solutions as individuals and then together with their squad members.

Whole group on the carpet:
- The teacher will ask the problem solvers about the animals they saw and learned about in the computer lab.
- The class will review the resources they have used to learn about nocturnal animals.
- Refer to Chart 1 – Problem Solving. Go over all of the facts from the beginning of the lesson. Review the need to know section and the answers. Answer any unanswered questions at this time if the problem solvers are able to do so. Look at the possible solutions. Call attention to the possible solutions that have been ruled out. Briefly discuss how learning about the problem led the problem solvers to believe that those ideas were not possible solutions anymore. Point out the possible solutions that are still listed - should all be nocturnal animals.

Whole Group Activity at their tables:
- Teacher will show the class a pocket chart. On the bottom of the pocket chart there are cards with the names of the nocturnal animals that are still possible solutions.
- Each problem solver will be writing their name on a card.
- Each problem solver will be asked to go to the pocket chart and put their card on top of the possible solution that they agree with to create a class graph.
- Teacher will review the pocket chart with the class. Teacher will explain how no one is wrong and that after reviewing many resources and making many discoveries, several different options exist. It is also okay if any of the problem solvers think it is more than one animal. They need to fill out two cards with their name.

Squad Work at their tables:
- Teacher will ask squads to sit together. Teacher will point out squads that are sitting quietly and listening.
- Teacher will explain that the squads will be having a RAP session to come to an agreement on which possible solution(s) they agree with. The squad members need to come to an agreement by discussing which animal(s) they think did this and why they think it is that animal. Teacher will stress the importance of being respectful while listening to other problem solvers' ideas. Teacher will circulate to help facilitate discussions.

The teacher reviews previous lessons and charts hanging in the classroom. Possible solutions that have been added to the problem solving chart are reviewed. Solutions that have been ruled out are discussed as well.

Students are given the opportunity to choose the solution that they feel solves the problem best. The facilitator has the responsibility of stressing that no answers are incorrect and that any solution can be considered as long as students can defend their thinking.

After individual choices are made, students meet with their squad members to find a common solution to represent their group. The facilitator will circulate to meet with each group during this time to make sure that discussions are respectful, students are

Whole Group at their tables: • The teacher will mention what she heard as she circulated. The teacher will point out squads that were communicating effectively by looking at the speaker, taking turns talking, and listening respectfully. Teacher will point out how important it is to come to an agreement and make decisions as a squad respectfully.	using effective communication skills, and to ask questions to prompt student thinking.

Day 13		
Materials Needed: The Problem Statement Chart 1 – "Problem Solving" Chart 2 – "Working Together" Chart 3 – "Our Discoveries" Posters Drawing materials – markers, pencils, crayons Resources – books, magazines, Charts, posters	*Reminders:* -Encourage problem solvers to write words on their posters, particularly the name(s) of the nocturnal animal that they are drawing. -Remember to point out what squads are doing that shows they are working together well. -Remember to stress that each member of every squad must have some work done on the poster.	Because the facilitator feels that the content has been learned, she is concluding this unit on nocturnal animals. To conclude, students have met to agree upon a final solution and will now have the opportunity to create a poster to represent their final choice that will be presented to the rest of the class.

Whole Group at the carpet:
- The teacher will review the problem statement, the possible solutions from Chart 1 – Problem Solving, and the discoveries made on Chart 3 – Our Discoveries (5 minutes).
- The teacher will point out the possible solutions on the pocket Chart and remind problem solvers of how they each had their own idea of which animal could have caused the problem. The teacher will then discuss how important it is to come to an agreement within the squads on which animal it is.

Squad Work at the tables:
- Squads will be given a poster and drawing materials. Teacher will remind problem solvers of how to work together using Chart 2 – Working Together.
- Squads will work together to draw pictures and write name(s) of nocturnal animal that they think caused the problem. Problem solvers will use the artifacts in their portfolio to help them make final decisions as they work on their poster.
- Teacher will circulate to ask questions about why that particular animal was chosen.
- Problem solvers will be encouraged to use resources around the room to find pictures and words to copy onto their posters.
- Teacher will collect posters – finished and unfinished.

This lesson begins with a review again to remind learners of what has been learned throughout the entire unit.

Students are reminded of how to work together using the chart created including the students' thoughts on how to work together.

Artifacts collected in the portfolios are used to help students make decisions for what to draw on their posters.

As students begin to work, facilitator circulates around the room to prompt students with questions and begin having students defend their choice in preparation for their presentations.

All resources used for discovery during this

	unit are available to the learners during this culminating activity.

Day 14		

Materials Needed:
    The Problem Statement
    Chart 1 – "Problem Solving"
    Chart 2 – "Working Together"
    Posters
    Drawing materials – markers, pencils, crayons
    Resources – books, magazines, Charts, posters
	Reminders:
	- Encourage problem solvers to write words on their posters, particularly the name(s) of the nocturnal animal that they are drawing.
	-Remember to point out what squads are doing that shows they are working together well.
	-Remember to stress that each member of every squad must have some work done on the poster.	

Whole Group on the carpet: • Teacher will remind problem solvers of their task – working together to complete a poster that shows the possible solution they have chosen. • Teacher will remind problem solvers of how to work together using Chart 2 – Working Together. • Teacher will point out places in the room where resources can be found to help with illustrating their possible solution – classroom library books, posters, anchor charts, pocket charts. Squad Work at the tables: • Squads will be given the poster they started working on yesterday and drawing materials. • Squads will work together to draw pictures and write name(s) of nocturnal animal that they think caused the problem as well as add detail to their poster – examples: things you would see in the night sky, dark sky, moon, food that the animal would eat. • Teacher will circulate to ask questions about why that particular animal was chosen and to guide students in adding detail to their poster by prompting them with questions about their nocturnal animals. Whole Group on the carpet: • Teacher will discuss with the problem solvers the positive behaviors she noticed as the squads worked together on their posters. • Teacher will explain that for the next two days, squads will be presenting their posters to the rest of the class.		Details like pictures and words are being added to the posters as the facilitator meets with the small groups of learners. Posters are collected at the end of this lesson and plans for presenting are shared with the students. The facilitator shares the upcoming steps, a purposeful instructional decision, to allow students time to prepare for what they would like to share when their squad presents. This also allows the students to decide the order in which they will speak and what each student will share during the presentation. Any students feeling nervous about the presentations are provided with this information as a warning and a reminder of what is expected so that they can prepare accordingly.

Day 15		
Materials Needed: Student posters	*Reminders:* -Be sure to prompt every squad member to speak during the presentation. -Announce what the presenting squad did well at the end. -Announce what the audience members did well at the end.	During the final two days of the unit, students share their final solutions with the rest of the class by presenting their posters.
Whole Group at tables: • Teacher explains that the squads will begin giving their presentations today. Some squads will present today and some squads will present tomorrow. • Teacher talks about the guidelines for the presentations: 1. Every squad member must share at least one time. 2. Tell the rest of the class the solution you chose. 3. Explain your poster and your illustrations. 4. Explain why you chose that solution. 5. Try to speak loudly so everyone can hear you. • Teacher talks about the guidelines for being a good audience member. 1. Eyes on the speaker. 2. Listening respectfully. 3. Applause at the end. 4. One or two problem solvers from the audience will be called on to share a "glow." A glow is something that the presenting squad did really well. 5. Another problem solver or two from the audience will be called on to share a "grow." A grow is something that the presenting squad could work on or make better for their next presentation. • Teacher chooses a squad to do the first presentation. The first squad stands on the carpet while the audience sits at their tables. Their poster can be hung on the easel or on the board. • Presentation #1 begins. Follow the guidelines above. Conclude with glows, grows, and applause. • Presentation #2 begins if time permits. Follow the guidelines above. Conclude with glows, grows, and applause.	The teacher provides guidelines or expectations for both the presenting students and students acting as an audience. Following the presentations, students from the audience will be called on to share a "glow" and a "grow" for the presenting group. This activity allows the presenting group to hear comments about what they did well and suggestions for how to improve during their next presentation. Comments such as "good eye contact" and "colorful poster" are to be expected at this level. Suggestions such as "speak a little louder" or "face the audience" are expected at the kindergarten level. Glows and grows will increasingly become more relevant and helpful to the presenting group as more presentations are given throughout the course of the year. Providing a "glow"" and a "grow" is also helpful for	

	audience members. Students that have not yet presented can learn from the comments and suggestions to make their own presentation even better. This type of activity also helps audience members stay focused so that they can share comments and suggestions following the presentation.

Day 16		
Materials Needed: Student posters	*Reminders:* - Be sure to prompt every squad member to speak during the presentation. -Announce what the presenting squad did well at the end. -Announce what the audience members did well at the end. -Be sure to thank the problem solvers for all of their hard work. -Be sure to explain that the posters will be shared with the principal.	On the final day, the last presentations are given. The most important part of the conclusion of the unit is to deliver the solutions (posters) to the principal as it was she who asked for the kindergarten students to help solve the problem. A thank you card from the principal could later be read aloud by the teacher to again give the students a feeling of pride, a sense of importance, and a sense of being valued members of the school.

Whole Group at the tables.
- Teacher will remind problem solvers of the guidelines for presenting and being a respectful audience member.
- Teacher talks about the guidelines for the presentations:
  1. Every squad member must share at least one time.
  2. Tell the rest of the class the solution you chose.
  3. Explain your poster and your illustrations.
  4. Explain why you chose that solution.
  5. Try to speak loudly so everyone can hear you.
- Teacher talks about the guidelines for being a good audience member.
  1. Eyes on the speaker.
  2. Listening respectfully.
  3. Applause at the end.
  4. One or two problem solvers from the audience will be called on to share a "glow." A glow is something that the presenting squad did really well.
  5. Another problem solver or two from the audience will be called on to share a "grow." A grow is something that the presenting squad could work on or make better for their next presentation.
- Teacher chooses the next squad to do their presentation. The presenting squad stands on the carpet while the audience sits at their tables. Their poster can be hung on the easel or on the board.
- Presentations begin. Follow the guidelines above. Conclude with glows, grows, and applause.
- Complete all squad presentations.
- After every presentation has been completed, the teacher reviews the entire unit and how much the problem solvers have learned. The teacher explains that the posters with the solutions to the problem will be given to the principal. The teacher also thanks the problem solvers for all of their hard work in finding solutions.

A final review is necessary to point out how much knowledge the students have gained about nocturnal animals. This review also reminds students of the many different ways that they found information to make their final solutions. This is also done to prepare the students for the upcoming unit. The skills the students learned are reviewed and students can feel a sense of pride for all that they have accomplished.

• Teacher can address the new skills the problem solvers have been working on: communicating- speaking respectfully, taking turns speaking, listening respectfully, looking at the speaker; working together- sharing materials, having RAP sessions, being respectful; problem solving- finding a solution by learning about all the options; decision making- choosing one solution even though you started with many possible solutions and being able to explain why that is the correct solution.	

Unit 2 – Friendship

The Problem

Dear Kindergarten Problem Solvers,

   Let's pretend! It is the year 1620 and you are a Pilgrim. You are about to set sail on a ship to a new land. What will you bring with? What will you do when you arrive? Where will you live? Who will help you once you get there? Have an exciting journey!

Dear Kindergarten Problem Solvers,

Let's pretend! It is the year 1620 and you are a Native American. You are about to meet a group of visitors that have sailed to your land. What will they be like? What will they need from you? How will you help them? Have an exciting exploration!

Unit 2 – Friendship

Possible Learning Directions

Note to Facilitator: This web was created by the teacher before the lessons began. The teacher maps out the possible learning routes that are associated with the problem. As the students work through the problem, the students and the teacher may add other possible directions for their learning. The teacher uses this web to help steer the students down these paths if they seem off track.

Transportation

Friendship

Survival Skills

Relationships

Possible Directions

The first Thanksgiving

Qualities of a good friend

Making a new student feel welcome – being helpful

Life in the 1620's

How people are alike and different
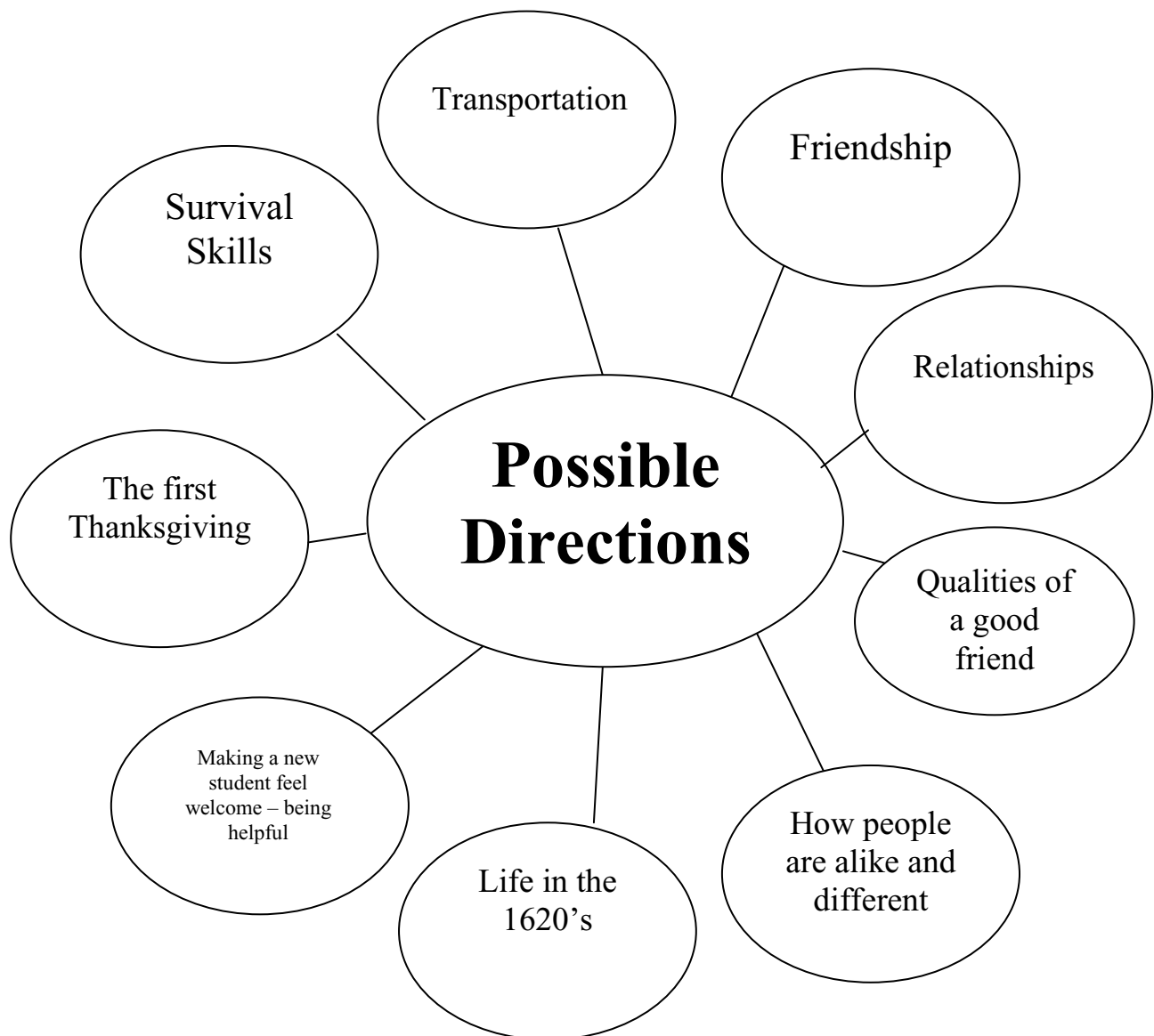
Unit 2 – Thanksgiving & Friendship

Lesson Plans

Day 1

Materials Needed:
    The problem
    Chart 1 – "Problem Solving"
    Markers
    Post-it notes
    The poem
    Pocket chart with poem written on sentence strips
	Reminders:
	-Continue to call students Problem Solvers
	-Be present during squad RAP sessions to note positive behaviors and guide conversations
	-Involve problem solvers as much as possible during chart making and poem reading

Whole group on the carpet:
- The problem is slid under the door. One problem solver can retrieve the envelope with the problem and hand it to the teacher. The class will be divided in half. The teacher will take half of the class and the reading teacher will take the other half.

Half of the class on the carpet, Half of the class in the reading area:
- The teacher and reading teacher will read the problem(s) aloud to their group. One group will hear about the pilgrims and the other will hear about the Native Americans.
- The teacher for each group will show the class a "Problem Solving" anchor chart.
- The problem solvers will raise their hands to offer facts that they heard in their problem.
- The teachers will then ask their group what else they need to know about. As students offer suggestions, the teacher will record their ideas on the "Problem Solving" chart in the need to know section.
- The teachers will then begin to facilitate a discussion about the problem and what they know and what they need to know. From here, problem solvers can offer ideas for possible solutions. The teacher will record the possible solutions on post-it notes and have the students post their thoughts on the "Problem Solving" chart in the possible solutions section.

Squad work:
- Problem solvers will stay on their carpet. They will sit with their squad members in a circle. They will have a

This unit is set up differently than the first. The problem in this unit divides the students into two groups. Half of the class hears the problem read and asks that they pretend to be Pilgrims. The other half of the class hears a different version of the problem asking them to pretend to be Native Americans. Using a variety of problems and scenarios helps keep students motivated in a PBL classroom.

The reading teacher participates in delivering the problem statement in this unit. It is helpful to have professional relationships with other staff members for this purpose. The principal, librarian, computer technician, and the reading teacher have been used in these two units. Having another

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RAP (Respecting All Problem solvers) session where every squad member has a chance to say one thing about the problem. The other squad members will listen respectfully. Teachers will sit with each squad for a minute or two to guide the conversation and make sure everyone has a turn to share. Teacher will clap 2 times to get the attention of all squad members. Whole group on the carpet: • Teacher will invite all problem solvers to the carpet. She will ask someone from the Pilgrim group to tell the rest of the class who they will be pretending to be. She will then ask someone from the Native American group who they will be pretending to be. • The teacher will read the poem *Pilgrim, Pilgrim* by M. Hubbard aloud to the class. • The teacher will invite the problem solvers to join in the second reading of *Pilgrim, Pilgrim* as they will say the line that repeats "Pilgrim, Pilgrim, what do you see?" The teacher will read the other lines aloud to respond.	adult in the room also helps with managing the entire class and holding the attention of the students during the first whole group session of the unit as it usually the longest. The squad work during this lesson is used to have students begin communicating right away. The teachers were meeting with the groups which provided individualized attention for guiding, directing, and prompting. The last activity for this lesson involves student listening and participation in a recitation of a poem. This poem, included in Appendix C, provides some background information about the Pilgrims. It is also a simple way to engage learners in initial content for this unit.

Day 2		

Materials Needed:
   The problem
   Chart 1 – "Problem Solving"
   The poem
	Reminders:
	-Continue to call students Problem Solvers
	-Be present during squad RAP sessions to note positive behaviors and guide conversations
		This lesson focuses on relating the Pilgrims and Native Americans story to friendships, relationships, and making new students feel welcomed in their classroom.

Whole group on the carpet:
- The teacher will review the problem with the whole class. The teacher will remind the class that half of them are pretending to be Pilgrims and the other half are pretending to be Native Americans.
- The teacher will ask the Pilgrims to sit on the right side of the carpet and the Native Americans to sit on the left side of the carpet. The two groups will face each other.
- The teacher will explain that the Pilgrims left their home and sailed to new land where the Native Americans already lived.
- The teacher will ask the Native Americans what they will do when the Pilgrims arrive. (the teacher will call on several problem solvers to get different ideas)
- The teacher will then ask the Pilgrims what they will do once they arrive in the unknown land. (the teacher will call on several problem solvers to get different ideas again)
- The teacher will relate this activity to if new students came to join their class. She will explain that the new students would be like the Pilgrims. They would not know where anything belongs or where they should sit or what they should do. The teacher will then ask the class what they would do if new students came. The teacher will relate their answers to how the Native Americans would respond to the Pilgrims.
- The teacher will review the poem Pilgrim, Pilgrim with the class. The problem solvers will read the repeating line "Pilgrim, Pilgrim, What do you see?" and the teacher will read the other lines aloud.

Squad work on the carpet:
- Each squad will have a RAP session to discuss what the Pilgrims could see after hearing the poem.
- The teacher will walk around and listen while the squads practice sitting in a circle, listening respectfully, looking at the speaker, and taking turns speaking.

Whole group on the carpet:
- The teacher will review what a Pilgrim is: a person that sailed to the new land to get away from unfair rules.
- The teacher will review what a Native American is: a

The teacher keeps reminding the students of their role in this problem. She also continues to physically divide the class as they are seated on the carpet to create a visual difference for the students. The first whole group session during this lesson focuses on communication. Students are applying what they learned during the first unit to be able to listen to each other, face the person speaking, and take turns sharing ideas.

The poem from the first lesson of this unit is reviewed and reread to provide the basis for the next small group discussion. Students will be practicing effective communication skills while discussing the content.

During the final whole group session, the teacher shares definitions to clarify the roles of the students.

person that already lived on the land and knew how to build houses and grow food.	

Day 3		

Materials Needed:
    The problem
    Chart 2 – "Working Together"
    Drawing paper
    Drawing supplies
    <u>*The Very First Thanksgiving Day*</u> *book*
    Pictures of Mayflower, Pilgrims, Native Americans, and corn stalk
	Reminders:
	-*Continue to call students Problem Solvers*
	-*Be present during squad RAP sessions to note positive behaviors and guide conversations*
	-Walk around during independent work time to listen to their conversations.
	-Encourage problem solvers to write words on the illustrations as well.
		A read aloud is used during this lesson as some problems can be storybook based and therefore engage the students in a familiar activity. Reading a story aloud to the class is also helpful in allowing students to make discoveries as the story unfolds since their researching skills are limited at this age.

Whole group on the carpet:
- The teacher will ask the problem solvers to remind her of the problem or some of the facts from the problem.
- The teacher will remind the problem solvers of how the problem relates to having a new student in class.
- The teacher will read <u>The Very First Thanksgiving Day</u> by Rhonda Gowler Greene. The teacher will choose 4 problem solvers to stand up in the front of the room while she reads. Each of the four problem solvers will hold a picture (1 Mayflower ship, 1 Native American, Pilgrims, and 1 stalk of corn). The pictures will be held up when the teacher reads about them in the story.

Squad work on the carpet:
- After the story is read, the problem solvers will be arranged on the carpet in their squads.
- Each squad will have a RAP session to discuss how the Pilgrims and Native Americans worked together and helped each other.
- The teacher will remind the squads to sit in a circle, look at the speaker, listen respectfully, and take turns speaking – refer to Chart 2 "Working Together."

Independent work at the tables:
- The problem solvers will illustrate one thing the Pilgrims and Native Americans did together in the story.

Squad work at the tables:
- Once all illustrations are complete, each problem solver will share what they drew with their squad at their table. Again, they will practice looking at the speaker, listen respectfully, and taking turns sharing.
- Illustrations will be placed in the Problem Solver Portfolios.

Whole group sessions generally begin with a review of the anchor charts. This is also a time for providing reminders about the content and skills being practiced.

Reading a book to the class is a familiar activity. A strategy, used in this lesson to help hold the students' attention, is to have student volunteers hold picture cards during the storytelling. The cards show pictures of the main ideas in the book. As the teacher reads words that relate to the pictures on the cards, the student volunteers hold up the cards. The volunteers were actively listening so they knew when to hold up their

| | card and the rest of the class was actively listening as they watched for the volunteers to remember to hold up the picture cards.

The first small group session is used to practice communicating and collaborating to discuss the content. Independently, the students take what they learned from the story and their discussions with squad members to create an illustration to demonstrate their understanding.

The students are arranged at tables in this class. The students sit with their squad members at tables all day long. The illustrations are shared at the tables as the teacher circulates to listen to students sharing, watch for respectful communication, and write down notes from observations during this time.

The illustrations are placed in the problem solver portfolios and are used and reviewed throughout the unit to help make decisions about possible solutions. |
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Day 4		

Materials Needed:
  The problem
  Chart 2 – "Working Together"
  Chart paper
  Markers
	Reminders:
	-Continue to call students Problem Solvers
	-Be present during squad RAP sessions to note positive behaviors and guide conversations
	-Facilitate the whole group discussions by allowing the problem solvers to lead and guide the discussion.
		Student discussions from the previous lesson steered learning towards transportation. Because students were learning about how the Pilgrims traveled, student interests were sparked and therefore the students led the direction of their learning with guidance from the teacher.

Whole group on the carpet:
- The teacher and problem solvers will review the problem.
- Remind class of how they had previously discussed how the Pilgrims came to the new land. Remind them of how some problem solvers mentioned the dangerous journey by boat and the possible danger in the water.
- Discuss how over 400 years ago, traveling by ship to get across water was the only way to travel.
- Ask squads to sit together on the carpet.

Squad work on the carpet:
- Each squad will have a RAP session to discuss the different ways people can travel. (hopefully cars, trains, airplane, boats will be mentioned)
- The teacher will walk around and listen while the squads practice sitting in a circle, listening respectfully, looking at the speaker, and taking turns speaking. Refer to chart 2 "Working Together."

Whole group on the carpet:
- The teacher will introduce the word "transportation."
- The teacher will ask some of the problem solvers to share the different ways that people can travel.
- The teacher will create a list of different modes of transportation as the problem solvers share what they discussed in their RAP sessions.
- Facilitate a discussion comparing the different modes of transportation.
- Discuss how the journey by ship must have been a rough trip. Discuss the waves, possible danger lurking below, cold temperatures, crowded conditions, and lack of food. Allow students to share their thinking about the travel conditions by ship.

This lesson focuses on the different modes of transportation. This topic seemed to relate to the overall unit and appealed to the students. Some students, during the previous lesson, began discussing sharks in the water as the Pilgrims traveled. The teacher chose to allow those students to use classroom books to see pictures of sharks, have a short discussion, and then redirected their learning back to the specifics of the problem. The majority of the class had questions that related to transportation and the differences between traveling then and now. The teacher made the decisions about which path to allow her

	students to travel down without disregarding individual interests and inquiries.

Day 5

Materials Needed:
   The problem
   *Chart 2 – "Working
Together"*
   Butcher block paper
   Drawing paper
	Reminders:
	*-Continue to call students
	Problem Solvers*
	*-Walk around during squad
	work time to guide conversations
	as needed.*

The previous lesson focused on transportation. Students were discovering hardships faced by Pilgrims during their travels by boat. One of the main hardships discussed was the weather. The previous lesson guided the direction of this lesson as it focuses on the four seasons and the typical weather in each season.

Whole group on the carpet:
- Write the four seasons on the board.
- Read the seasons aloud to the class.
- Arrange the problem solvers into squads on the carpet.

Squad work on the carpet:
- Each squad will have a RAP session to discuss what they know about the four seasons.
- The teacher will walk around and listen while the squads practice sitting in a circle, listening respectfully, looking at the speaker, and taking turns speaking. Refer to chart 2 "Working Together."

Whole group on the carpet:
- The teacher will ask the problem solvers to share what they discussed about the four seasons.
- The teacher will review each of the four seasons.
- The class will focus on winter – the time during which the Pilgrims traveled by ship, the reason why they couldn't plant or grow crops for food, the reason for sickness
- The teacher will facilitate a discussion about winter – winter activities, weather, holidays

Squad work at the tables:
- Squads will work together to draw a winter scene of the Pilgrims trying to survive the cold, hard times (either on the ship or on land).
- Each squad will work together to create a scene. They will not all draw their own scene on the same paper. They will work together to create one large scene.
- Teacher will walk around to listen to the conversation about the Pilgrims and their hardships in the winter. Teacher will also be listening for teamwork, cooperation, collaboration, problem solving, and effective communication skills.
- Teacher will collect scenes to be presented later.

The names of the four seasons are provided as a starting point during the whole group session. From there, the students practice their communication and collaboration skills as well as share their schema about the content.

The teacher then narrows the focus of the lesson to concentrate on one season as it relates to the hardships faced by the Pilgrims.

This lesson also focused on how the Pilgrims were leaning on each other to survive. This led to a conversation about friendships and relationships and how people help each other.

	The final activity during this lesson involves the squads working together to illustrate one scene. Illustrations are used frequently in kindergarten classes as they are an age appropriate way of demonstrating understanding. This activity called for teamwork and cooperation. Students needed to work together to create a scene that showed their collective ideas about winter. Respectful communication played an important role as students shared materials and moved around the table to add to each other's work. The scenes are collected and will be used during the following lessons.

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Day 6		

Materials Needed:
    The problem
    Chart 2 – "Working Together"
    Venn Diagram poster
    Markers
    Seasons books
	Reminders:
	 -Continue to call students Problem Solvers
	 -Walk around during squad work time to guide conversations as needed.
	 -Prompt students to share differences between winter and spring during sharing time.
		During this lesson, the teacher helps students to develop higher order thinking skills such as comparing and contrasting. The use of a Venn diagram will help students in comparing and contrasting winter and spring.

Whole group on the carpet:
- Review the problem.
- Review the four seasons.
- Talk to class about how during the winter life was very hard for the Pilgrims and during the spring life was much better.
- Explain that the squads will look at books about seasons of the year to see pictures of what winter and spring are like. Ask them to look for as many details as they can about each season. Ask them to focus on what is different between winter and spring.

Squad work at the tables:
- The teacher will review how problem solvers work together – refer to chart 2 "Working Together."
- Each squad will receive a few books about seasons to look through together.
- The teacher will walk around to listen for effective communicating and collaborating.
- The teacher will also be listening for differences between winter and spring.

Whole group on the carpet:
- The teacher will ask the problem solvers join her on the carpet.
- The teacher will show the class a poster of a Venn diagram. She will show them that the left side says "winter" and the right side says "spring." She will then ask them to share what they learned about winter by raising their hand and waiting to be called on. The winter facts will be listed in the left circle.
- The teacher will then use the winter facts to prompt students to share opposites about spring. The teacher will fill in the spring facts on the right side.
- The teacher will then ask if there were any similarities between the two seasons. Any similarities will be recorded between the two circles on the Venn diagram.
- The teacher can then facilitate a discussion about why winter (with cold weather, not enough warm clothes, and

This lesson continues to focus on the seasons of the year. The students are looking through resources gathered by the teacher from the classroom library, the school library, and the public library. The teacher provided the resources and then allowed the students to discover the content on their own and with their squad members.

The Venn diagram is explained. The titles are already printed with small illustrations to help students determine which side is winter and which side is spring. The teacher guides the students through filling out the Venn diagram by discussing and completing each portion of the diagram one at a time.

A culminating discussion is held to discuss overall

no way to grow crops) was very hard for the Pilgrims and why spring (with warm weather, no need for warm clothing, and plenty of crops growing for food) was much easier.	differences and similarities. The discussion on the seasons is then related back to the problem to help students have an understanding of the Pilgrims' hardships.

Day 7		

Materials Needed:
    Venn Diagram created yesterday
    Resources available on growing crops, planting, gardening
    Drawing paper
    Drawing supplies
    Chart 2 "Working Together"
    Problem Solver Portfolios
	Reminders:
	 -Continue to call students Problem Solvers
	 -Model the appropriate way to share materials at the table, listen to each other during discussions, and look at the speaker during whole group and squad work times.
		The content changes in this lesson to focus on growing food in the spring. The students review what they know about winter and the Pilgrims' hardships and begin discussing the need for growing food in the spring.

Whole group on the carpet:
- The teacher will review the Venn diagram created yesterday with the problem solvers. The focus will be the ability to plant and grow crops in the spring but not in the winter.
- The teacher and problem solvers will discuss how the winter was hard for the Pilgrims because they did not have very much food and they couldn't go to a store and buy some or grow any. Students can review their winter scenes at this time to prompt discussions.
- The teacher will give the problem solvers the opportunity to explore how food grows and what is needed to grow crops.
- The teacher will remind problem solvers how to work together – refer to chart 2 "Working Together."

Squad work at the tables:
- Problem solvers will look through books and magazines to learn about what is needed to grow food.
- Individually, each problem solver will illustrate what is needed while looking through books. (examples: sun, rain, tools, warm weather, seeds, dirt)
- The problem solvers will be sharing their illustrations with their squad members as they work together.
- The teacher will be circulating to help keep squads on task and to listen for positive, effective communication and collaboration skills.
- The illustrations will be placed in the Problem Solver Portfolios when they are completed.

Whole group on the carpet:
- The teacher will call on one or two problem solvers from each squad to share one thing that is needed for growing crops. The teacher will list their ideas on the easel or white board.
- The teacher will shift the focus on how a new student has come to class and possibly is not familiar with the

Teacher provides books and magazines from classroom library, borrowed from other classroom teachers, borrowed from the school library, and public library. The resources are made available for students to begin discovering information about growing food and what is needed to do so.

The students work together to look through books and have conversations about their findings. Individually each student will illustrate what they learned. The teacher circulates to converse with each individual about what they learned. The teacher can take notes during these one-on-one conferences with students. The illustrations, after being explained to the teacher, can be placed in the

| classroom procedures for snack time and lunch time.
• The teacher will prompt the problem solvers with "How would help the new student if they didn't have any snack or lunch food?" The prompt will then change to "How could the Native Americans help the Pilgrims during the winter when they didn't have any food?" | portfolios and used throughout the remainder of the unit for choosing possible solutions.

During the final whole group session for this lesson, the teacher allows a few members of each squad to share what was learned. If the teacher was unable to meet with each student or a student was not ready to meet earlier, the teacher would choose those students to share during this time.

The teacher then relates the discoveries from the previous few lessons back to the initial problem with whole group discussion prompts. |

Day 8		

Materials Needed:
   Venn diagram created on
Monday
   List created on Tuesday
   Posters
   Scissors
   Glue
   Magazines
	Reminders:
	-Continue to call students
	Problem Solvers
	-Prompt problem solvers to
	discuss why they are choosing
	certain pictures for the collage
	with their squad members.
		This lesson focuses on the collaboration skill and the content centers around food and eating. The lesson begins with a review of previous content and moves into a collaborative activity.

Whole group on the carpet:
- The teacher will review the Venn diagram made during Monday's lesson with the problem solvers.
- The teacher will then review the list created during Tuesday's lesson of what is needed to grow food so that the Pilgrims would not be hungry.
- The teacher will ask the problem solvers about what kinds of food can grow out of the ground? The teacher will list the student responses.
- The teacher will ask about what kinds of food the problem solvers eat on Thanksgiving. Meat – does not grow out of the ground. Teacher will facilitate a discussion about where the meat comes from. (hunting)

Squad work at the tables:
- Squads will return to the tables. They will each have a pair of scissors and glue. Magazines will be placed in the middle of each table. Each table will have one poster.
- Squads will be directed to look through the magazines and cut out pictures of anything from the list they created of what is needed to grow crops, any pictures of food that grows out of the ground, any meats that could have been hunted for, and any pictures of people helping each other to find food.
- The teacher will circulate during this time to ask problem solvers why they chose to cut out the pictures they included. The teacher will also be prompting problem solvers to show each other their pictures and tell their squad members why they chose those pictures.
- The teacher will also be listening for how problem solvers share, work together, speak and listen to each other.
- Each squad will create a collage to represent what they have learned so far. The collages will be collected at the end of the lesson and displayed in the classroom.

Whole group on the carpet:
- The teacher will tell the problem solvers that their hard work will be displayed in the classroom so everyone can see what they have learned about so far.
- The teacher will also point out the collaborative behaviors she observed while circulating.

The review covers the similarities and differences between winter and spring and what is needed to grow food. The teacher facilitates a discussion about foods that grow out of the ground and foods that needed to hunted for. This discussion leads into a conversation about Thanksgiving meals.

A collaborative activity involving using resources to find pictures of foods, what is needed to grow food, and food that can be hunted for begins. The teacher discusses content with individual students while watching for effective communication and collaboration skills being applied. Individuals find pictures and then put them together in a collaborative effort with their squad members to create one collage. The collages are displayed in the classroom to give students the opportunity to feel a sense of pride about their work.

Day 9		
Materials Needed: 　*Problem* 　*Corn is Maize: The Gift of the Indians* 　*Corn stalks made out of construction paper* 　*Glue* 　*Popcorn*	*Reminders:* *-Continue to call students Problem Solvers* *-Make sure that there is glue for every child at each table.* *-Pass out corn stalks for every problem solver.* *-Put a bowl of popcorn to be shared in the middle of each table.*	During this lesson, the teacher chooses a few pages out of a book to share with the students. The information shared provides the basis for discussions to take place during collaborative activities to follow.

Whole group on the carpet:
- The teacher will review the problem with the problem solvers.
- The problems solvers that are pretending to be Pilgrims will sit on the right side of the carpet and the problem solvers that are pretending to be Native Americans will sit on the left side of the carpet.
- The teacher will read pages 26 and 27 out of the book <u>Corn is Maize: The Gift of the Indians</u> by Aliki.

Squad work on the carpet:
- The Pilgrim problem solvers will thank the Native American problem solvers for all the ways they helped them (giving them dried grain to eat, showing them how to plant the crops, stuffing mattresses with husks, burning cobs to make fire for heat, making dolls). The Pilgrim problem solvers will raise their hands and wait to be called on by the teacher. When they are called on they will begin by saying "Thank you for…" and then finish the sentence with one of the things they learned from the book. The Native American problem solvers will respond by saying "You are welcome."

Squad work at the tables:
- The teacher will put a corn stalk at each seat and some popcorn.
- Pilgrim and Native American problem solvers will work together to share pieces of popcorn to glue onto stalks of corn. They will practice sharing and taking turns and learning from each other just like the Pilgrims and Native Americans did for the first Thanksgiving.
- Teacher will walk around and listen for cooperation and sharing.

Whole group on the carpet:
- The teacher will ask a few problem solvers what they learned today about the Pilgrims and Indians.
- Problem solvers will share what they learned one at a time by raising their hand and waiting to be called on.

Because whole group sessions that last too long tend to lose the interest of the kindergarten students, the teacher chooses a few pages of a book to share rather than reading the whole book. The pages shared focus on growing corn and the different ways Native Americans used the corn. The focus for this lesson stems from discussions from the previous lesson that concentrated on using all parts of the animals that were hunted. The teacher wanted to show how the Native Americans used all of the parts of the corn crop as well.

The students are divided again into Pilgrims and Native Americans. They practice using respectful communication by saying "thank you" and "you're welcome" when sharing how the Native

	Americans helped the Pilgrims use the different parts of the corn crop. A collaborative activity follows that allows students acting as Pilgrims and Native Americans to work together to glue pieces of popcorn on pre-cut corn stalks. The idea is to have the students act in a helping manner just as the Native Americans helped the Pilgrims in the story. Students are expected to cooperate and work together to share supplies and have discussions while the teacher circulates to listen for content and observe specific skills being practiced. A final review completes this lesson during a whole group session where the teacher calls on specific individuals, possibly students that she did not have the opportunity to meet with previously today, to share what they learned today.

Day 10		

Materials Needed:
    The problem
    Pilgrim and Native
American hat materials
    Construction paper strips
for hats
    The questions for
discussions
    Coloring materials
    Stapler
	Reminders:
	-Continue to call students
	Problem Solvers
	-Have the questions with you as
	you go to visit each squad.
	-Facilitate the discussions at
	each table reminding students of
	how to take turns talking and
	listening.
	- Save the hats for the upcoming
	presentations.
		During this lesson, students create hats in preparation for the final activity for this unit. As they work, the teacher circulates in the room to meet with each squad to ask questions and facilitate discussions about the initial problem statement.

Whole group on the carpet:
- The teacher will review the problem with the problem solvers. The teacher will review the questions in the problems.

Squad work at the tables:
- The problem solvers will work at their tables to create hats to identify which group they are in, either the Pilgrims or the Native Americans. As they work the teacher will ask them questions so that they can discuss the answer with their squad members. The teacher will visit each table to facilitate discussions using the questions below.
- Pilgrims Questions:
  What will you bring with?
  What will you do when you arrive?
  Where will you live?
  Who will help you once you get there?
- Native American Questions:
  What will the new people be like?
  What will the Pilgrims need from you?
  How will you help them?
- The teacher will help the students put their hats together with a stapler. Students will save their hats for their presentations.

The final activity, to take place during the following lesson, is a whole group presentation. The students make hats to wear during the presentation to identify them as Pilgrims or Native Americans. This is a collaborative activity where students are expected to share materials and communicate respectfully while the teacher meets with the different squads to facilitate discussions based on the questions from the problem statement.

This purpose of this activity is to practice collaboration and communication skills. This activity also gives the teacher time to meet with students before the presentation to check individual

	understanding.

Day 11		

Materials Needed:
    The problem
    The First Thanksgiving story
    Pilgrim and Native American hats
	Reminders:
	 -Continue to call students Problem Solvers
	 -Try to call on different problem solvers to fill in each blank.
	 -Prompt problem solvers to repeat lines if they forget to do so.
		During the first unit, the squads presented posters they created as a final activity. The final projects should be different from unit to unit to keep students interested and excited about sharing final possible solutions.

Whole group on the carpet: • Pilgrim problem solvers will sit on the right side of the carpet with their hats on. Native American problem solvers will sit on the left side of the carpet with their hats on. • The teacher will review the problem. • The teacher will explain that she will be reading a story about the first Thanksgiving and that she needs their help filling in the blanks. If a problem solver knows how to fill in the blank they should raise their hand and wait to be called on. When they are called on, they should stand up and give their answer. If the teacher says "The Pilgrims said…" the Pilgrims will stand up and repeat what the teacher said. If the teacher says "The Native Americans said..." the Native Americans will stand up and repeat what she said. • The students will show how much they learned by offering information to fill in the blanks and by participating in the skit. • After the story has been completed the teacher will remind the class about how the Pilgrims and Native Americans became very good friends and they helped each other. The teacher will ask the problem solvers how they can help each other in the classroom as friends. • The teacher will review the problem one more time and look at the possible solutions. Students will look through their portfolios to use their artifacts to aid in making decisions about the final solutions. The class will decide if any possible solutions need to be added or ruled out? • The teacher will conclude this unit by relating the possible solutions to the Pilgrims and Native Americans and friendships in kindergarten.		The class is divided for the final presentation to show that the Pilgrims and Native Americans are separate groups. A story, included in Appendix D, is used again but this time the students are helping to tell the story. Students are actively engaged in telling the story as they are called on to stand up and finish the lines of the story. This presentation shows how the students have acquired content knowledge as well as specific skills such as waiting to be called on, taking turns, and presenting relevant information. A discussion culminates the unit by having the Pilgrims and Native Americans share with each other how they helped each other and developed friendships.

	The problem is reviewed for a final time and students offer possible solutions based on all of the previous lessons and the artifacts collected in the problem solver portfolios. By the end of the lesson, the students are encouraged to sit together to show the relationship developed between the two groups.
	The final problem is related to welcoming a new student just as the Native Americans welcomed and helped the Pilgrims.

Appendix A: Charts

Chart 1: Problem Solving
(To be used Day 1 and throughout lessons as more information is discovered)

Notes to Facilitator: Recreate on chart paper. Display in classroom where it is visible for all problem solvers. Teacher writing, student writing, post it notes, student illustrations, and other pictures are used to complete this chart. Day 1, facts from the problem statement are filled in by the teacher as problem solvers recall them. Day 1, teacher facilitates discussion for what the problem solvers need to know to find a possible solution. Problem solvers offer "need to know" information and teacher records it on the chart. Throughout the rest of the lessons, more facts and need to know information can be added by teacher and problem solvers. Possible solutions should be added throughout the lessons by the problem solvers by copying words out of books, magazines, portfolios, etc. or by posting pictures of who/what the possible solution could be.

Facts	Need to Know
*	*
*	*
*	*
*	*
*	*

Possible Solutions

Sample Chart 1: Problem Solving

Chart 2: Working Together
(To be used Day 1 and throughout lesson as more information is discovered)

Working Together

(Insert ideas generated from squad discussions here in a bulleted list.)

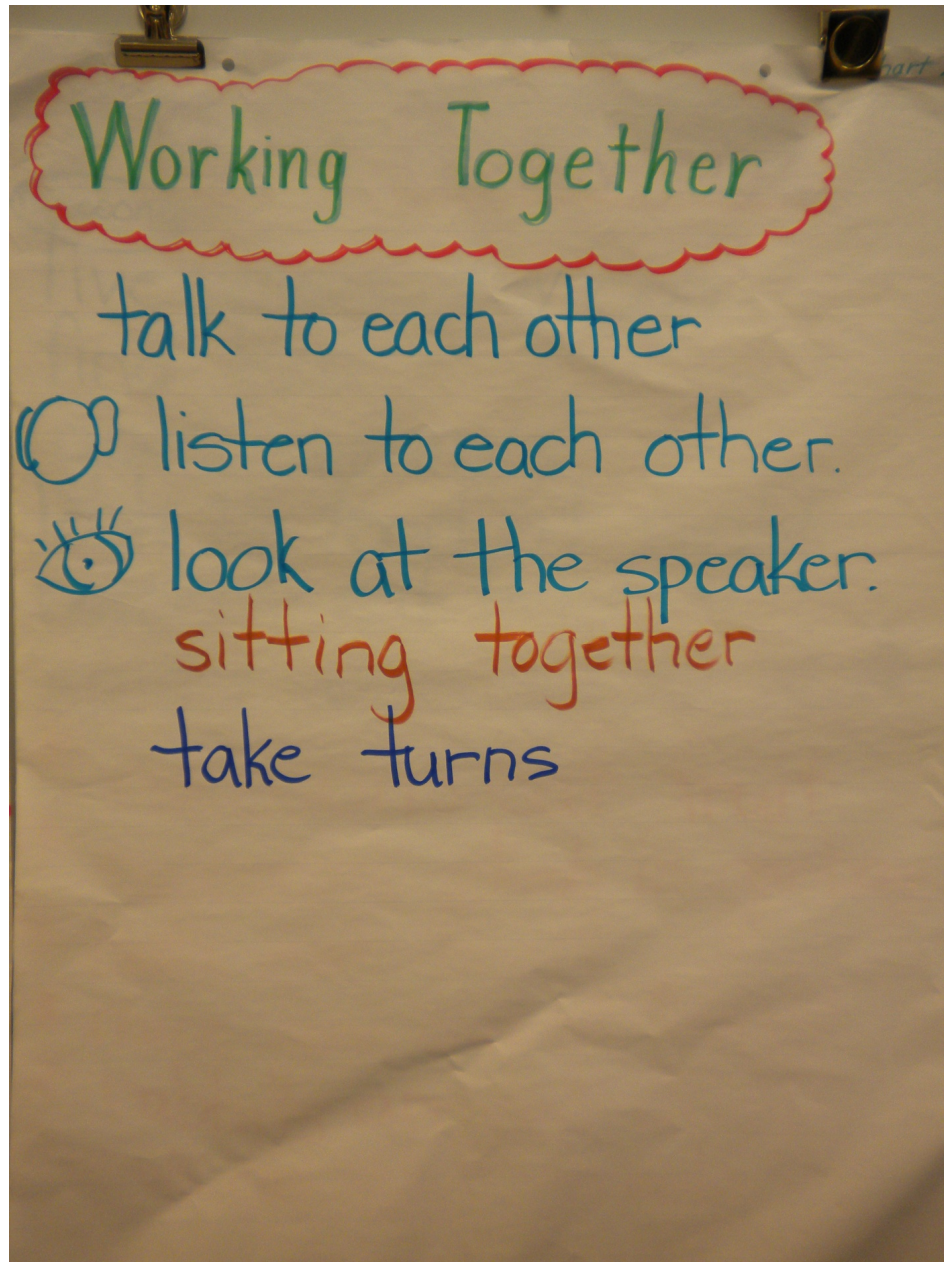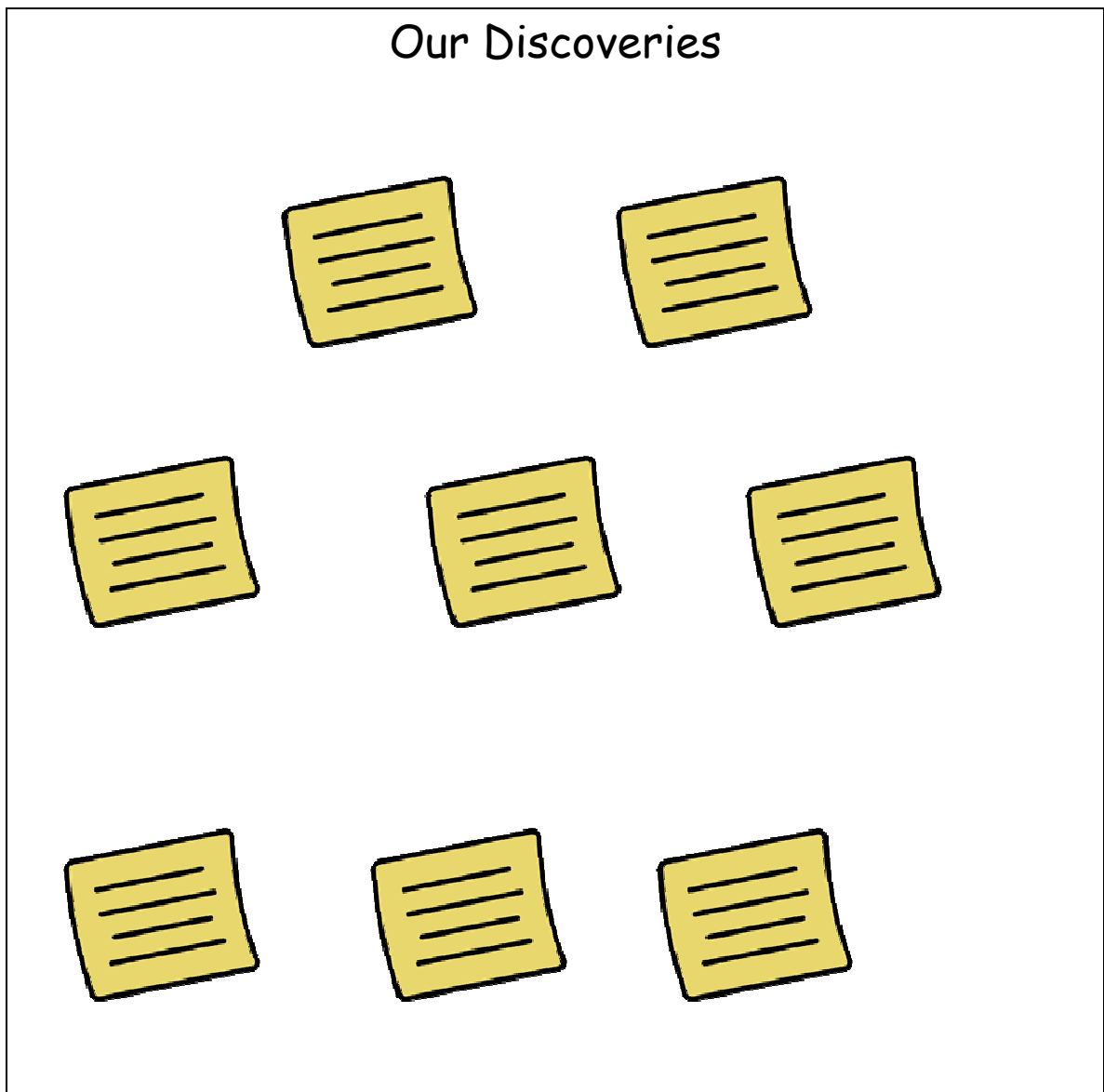Sample Chart 2: Working Together

Chart 3: Our Discoveries
(To be used Day 2 and throughout lessons as more information is discovered)

Note to Facilitator: Recreate on chart paper. Display in classroom where it is visible and accessible for all problem solvers. Teacher writing, student writing, and post it notes are used to complete this chart. Day 2, teacher reads a book aloud. During the read aloud, problem solvers may hear new information and offer their new learning to the teacher to record on a post it note. Problem solvers will post their new discovery on the chart. Discoveries can be added to the chart anytime new learning occurs throughout the rest of the lessons.

Our Discoveries

Sample Chart 3: Our Discoveries

Our Discoveries

(raccoons) live where they can find food.
good swimmers
look for food at night
raccoons eat fruit
spider webs are out at

* raccoons eat fruit
* raccoons climb in garbage.
* bats eat fruit
* mice are out at night
* rabbits are out at night
* owls eat small animals
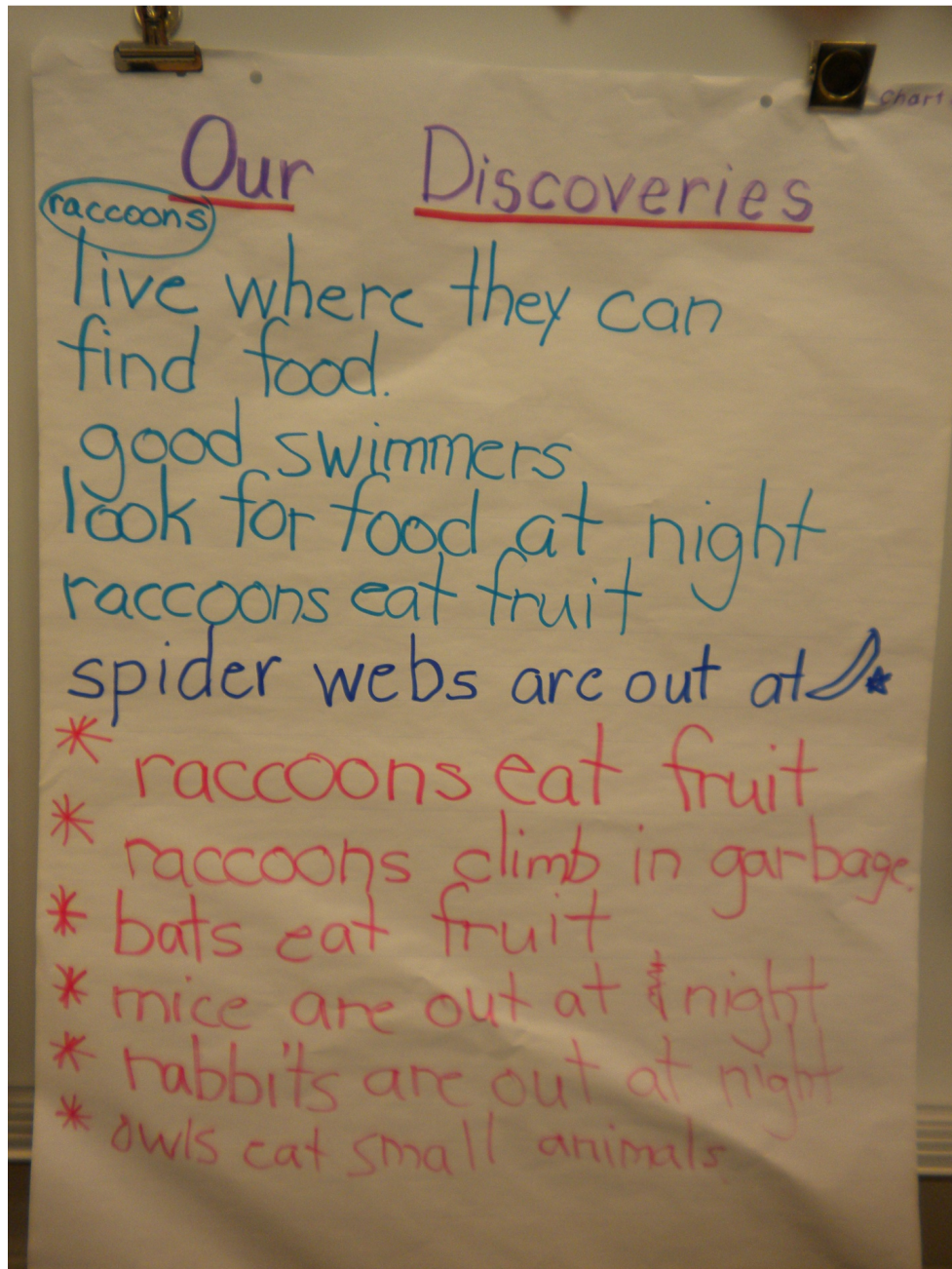
Chart 4 – Our Senses
(To be used Day 7 and throughout lessons as needed)
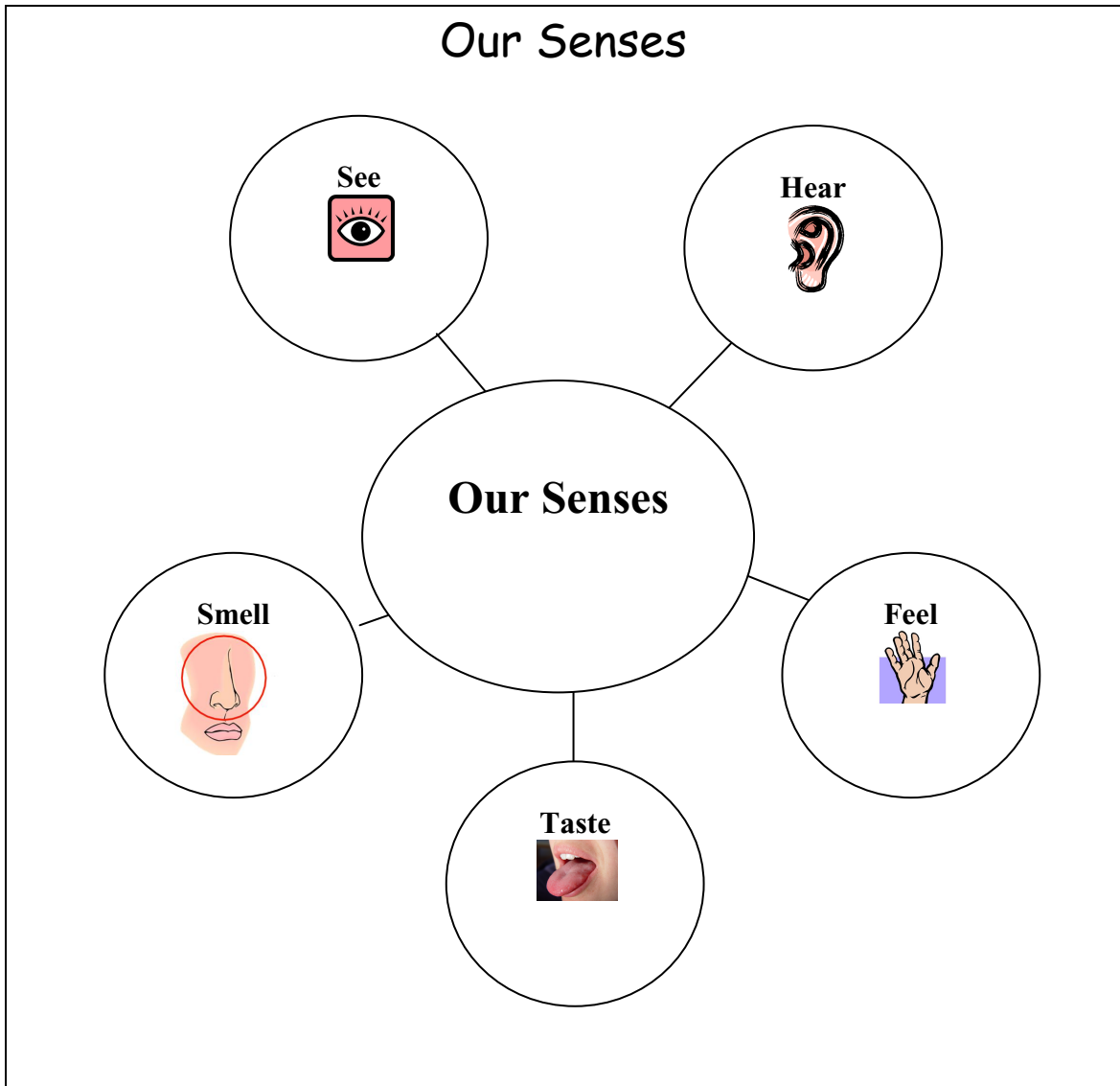
Sample Chart 4: Our Senses
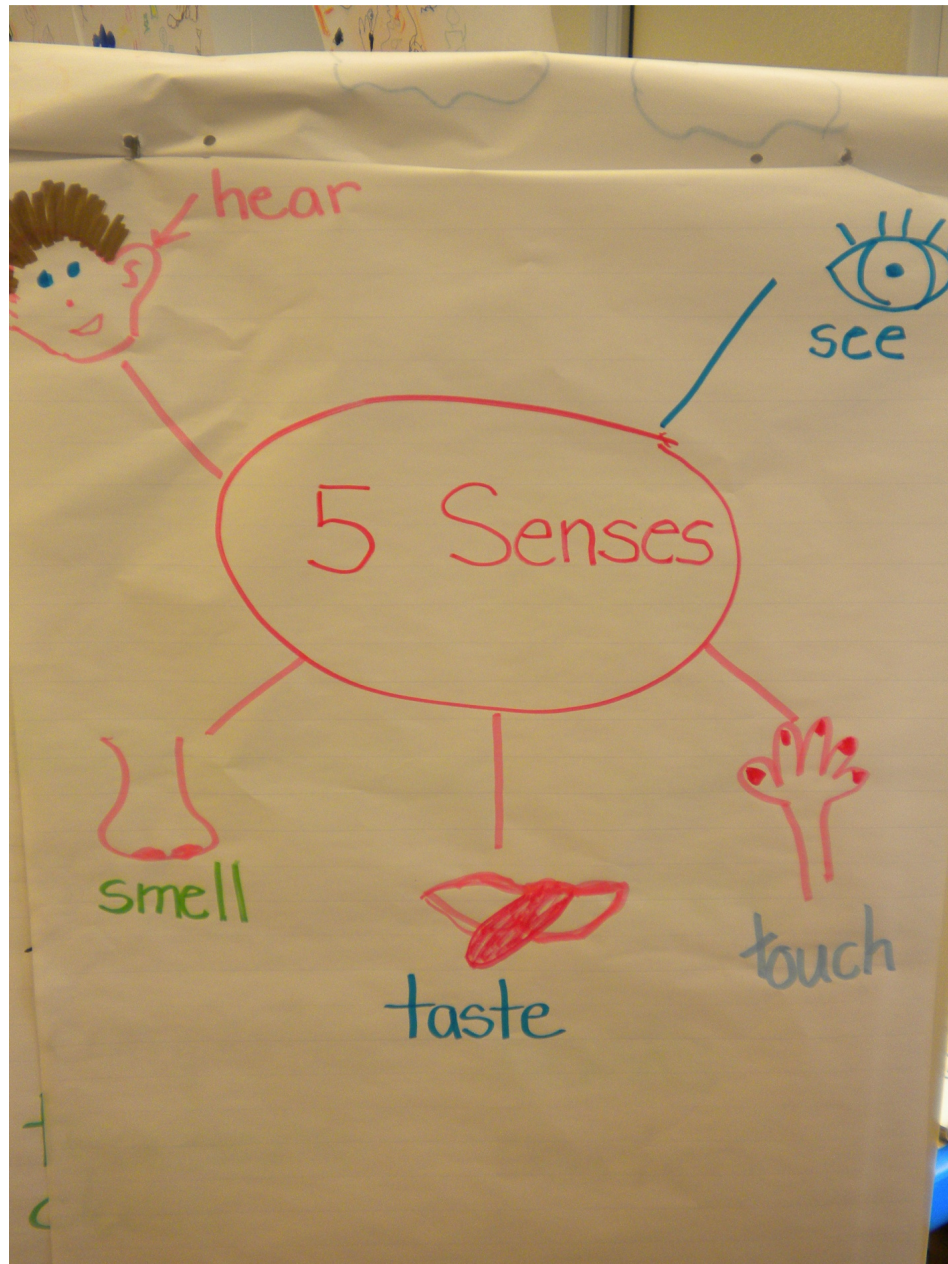
Appendix B: Student Posters

Sample Poster: Day & Night
(To be used Day 3 and then displayed in the classroom)

Notes to Facilitator: Recreate on chart paper. A line should be drawn to divide the poster into two equal columns. Pictures of suns and moons should be available for problem solvers to glue into the columns. The words "day" and "night" should be written on the board for problem solvers to copy on to their posters. Squads write words and draw illustrations to show what they know about daytime and nighttime.

Day	Night
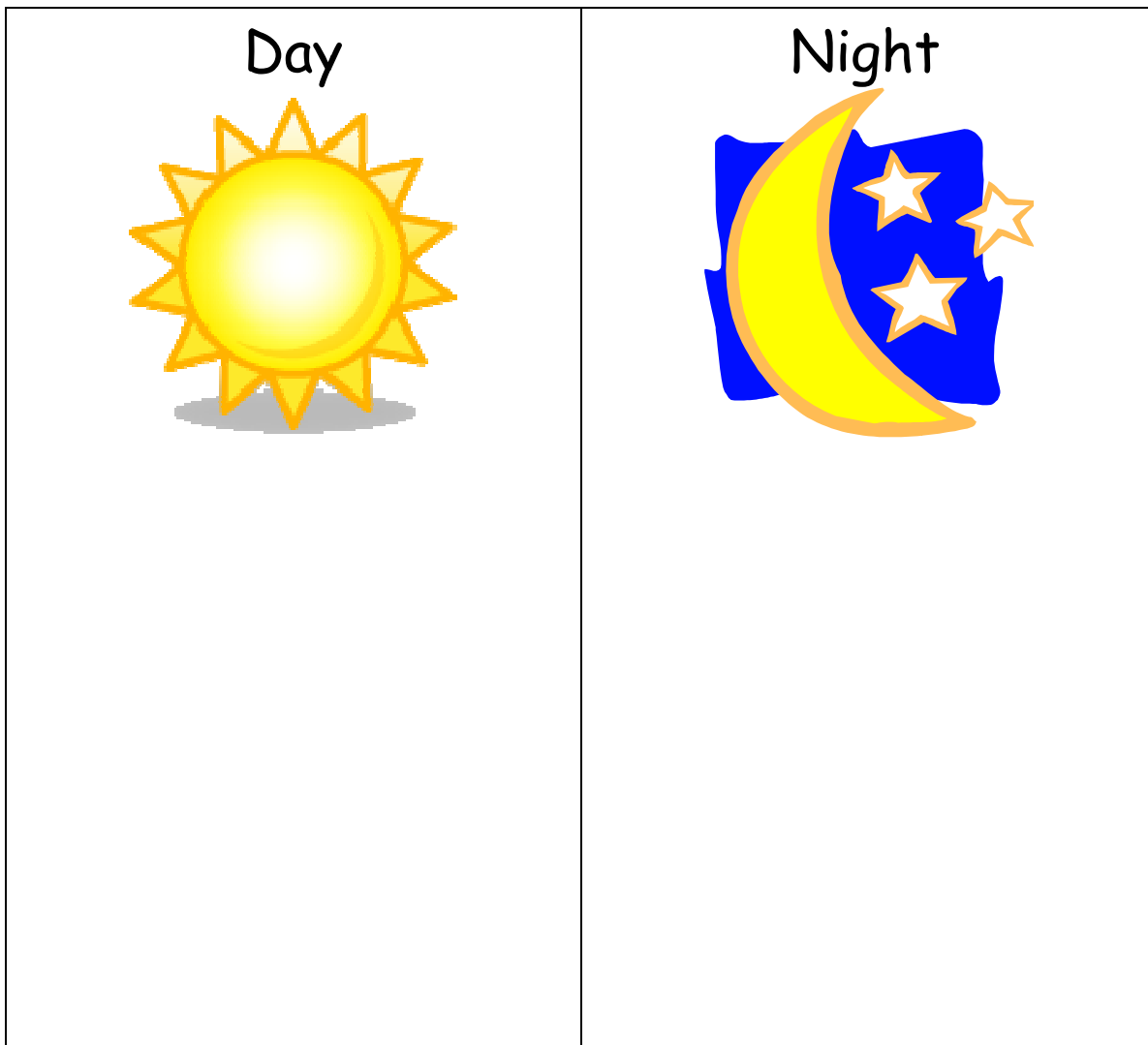
Sample Chart 4: Our Senses

Appendix C: Poem

(To be used during the first day of Unit 2)

Pilgrim, Pilgrim
(by M. Hubbard)

Pilgrim, Pilgrim, what do you see?
I see the king refusing my plea.
Pilgrim, Pilgrim, what do you see?
I see the Mayflower ready for sea.
Pilgrim, Pilgrim, what do you see?
I see a new land to set me free.
Pilgrim, Pilgrim, what do you see?
I see a hard winter, tough as can be.
Pilgrim, Pilgrim, what do you see?
I see a green bud on a spring tree.
Pilgrim, Pilgrim, what do you see?
I see a Native American helping me.
Pilgrim, Pilgrim, what do you see?
I see corn growing 1, 2, 3!
Pilgrim, Pilgrim, what do you see?
I see praise, for thankful are we!

Appendix D: Thanksgiving Story

(To be used during the last day of Unit 2)

Directions: **The teacher reads the story aloud. The students should repeat the lines in bold print. Students should also be called on to fill in the blanks or the underlined words.**

The First Thanksgiving

Adapted from story by Nora Smith

Four hundred years ago, the Pilgrims were very unhappy because their king would not let them make their own decisions.

The Pilgrims said **"Let's leave this country."**

They boarded a ship called the **Mayflower** to take them across the sea. The Pilgrims brought _____ and _____ with them to the new land.

There were one hundred people on the Mayflower - mothers and fathers, brothers and sisters and little children. They were very crowded; it was cold and uncomfortable. The children cried many times on the journey.

At last the Mayflower came in sight of land. It was a cold **Winter** and there was nothing to be seen but rocks and sand and hard bare ground. What do the Pilgrims need to do now that they have arrived? The Pilgrims need to **find food** and **find a place to live**.

Some of the Pilgrim Fathers went on shore to see if they could find any houses. But instead they met some **Native Americans or Indians.** The Pilgrims said **"Where will we live?"**

It was a cold winter and many Pilgrims got sick. The weather was cold, the snow fell fast and thick, the wind was icy, and the Pilgrim Fathers needed help to cut down the trees and build their church and their houses. Who would help them? **The Native Americans or Indians.** The Native Americans said "We will help you."

The Pilgrim mothers helped too but they were tired and cold and hungry. There wasn't enough food for everyone.

In the **spring,** the snow melted and the leaves began to grow.

Some friendly Native Americans came to visit the Pilgrims. One of the kind Native Americans was called Squanto, and he came to stay with the Pilgrims, and showed them how to plant **crops or corn**. He helped them to build warm **houses** to live in.

The Pilgrims were so thankful for the help from the Native Americans that the Pilgrims said **"let's have a great Thanksgiving party."** They invited the friendly Native Americans. The Native Americans said **"Thank you."**

So they had the first Thanksgiving party! They ate _____ and _____ and _____. Then the Pilgrim mothers made the corn and wheat into bread and cakes, and they had fish and clams too.

The friendly Native Americans all came to the feast. The Pilgrims and Native Americans became **friends**. They **helped** each other and they were thankful for each other.

Appendix E: RAP Session Poster

R especting

A ll
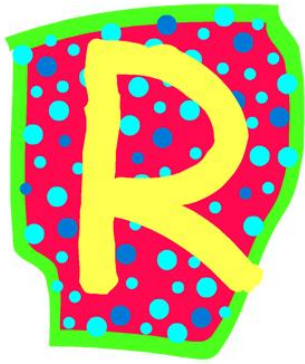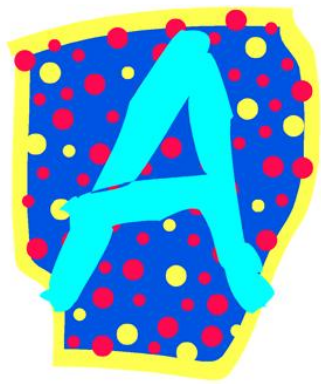
P roblem Solvers

Appendix F: Problem Solver Portfolio Cover Page

roblem

olver

ortfolio

Appendix B: Sample Observation Field Notes

(To be used during Participant Observations)

Date of Participant Observation: <u>November 3, 2010</u>

Record information regarding:		
Overall lesson	student behaviors	conversations
Events	teacher quotes	student quotes

- Students are sitting quietly on the rug.
- "What were some of the worries or problems that the Pilgrims had?" – teacher
- "They were coming to a new land." – student
- "They need to bring all of their stuff and tools." – student
- "The king wasn't giving them a choice." – student
- "They need a boat to get there." – student
- "I wonder if the Pilgrims are going to follow the Indians." – student
- One student raises her hand to offer her idea and then says "Can I think really quick?" and puts her hand back down.
- Teacher relates problem to how a new student would feel coming to a new school.
- "I don't know anyone." – student
- "Somebody might hurt someone." – student
- Teacher relates all student comments back to the Pilgrims.
- "I've been to a new school before and I didn't even know the people and I was so scared." – student
- The teacher makes a chart with two columns. The left column is titled "new school" and the right column is titled "new land." In the left column the teacher writes kids and where will I sit? As students offer suggestions for what they might think about coming to a new school. In the right column she writes people, where will I live, house, and tools as the students offer ideas.
- "If the Pilgrims come and see the Indians, they might fight." – student
- Teacher patiently listens to each student response. She allows adequate wait time for them to think about what they to say and then share their thought.
- "If they need to fish on the boat." – student
- "They need tools to build a house." – student
- "Show me how we sit when we read a story." – teacher
- Teacher reads book <u>The Very First Thanksgiving Day.</u>
- Teacher chooses four students to come up and hold a picture of the Mayflower, corn, Pilgrims, or Indians.
- If student hears the teacher say Mayflower, that student holds up the picture as part of interactive story telling activity.
- Children sit "criss cross applesauce" on the rug.

- "Author" – student
- "Illustrator" – student
- Class helps interactive story teller know when to hold up their picture and when to put it down.
- Class looks very closely at the illustrations.
- "The Indians are helping the Pilgrims!" – student
- "I see fish!" – student
- "I see the boat that they sailed on." – student
- "What is it called?" – teacher, class yells "Mayflower!"
- "Is he trying to hold that thing at the boat?" – student
- "Who is this brave group?" – teacher, class yells "The Pilgrims"
- "I have a connection. When I was three years old I went on a boat. At first it was kind of scary." – student
- One student applauds another student for remembering to hold up the picture during the story.
- "I helped him." – student
- "I have a connection. It is the month of Thanksgiving and we are learning about Thanksgiving." – student
- Teacher divides squads and separates them around the room.
- "Make your circle." – teacher
- All squads form a circle in their area.
- "Talk about how the Indians would help the Pilgrims." – teacher
- "You may go first." – student
- "Help them build houses." – student
- "Help them get into the boat." – student
- "The Indians try to help them build stuff and make a house." – student
- "I think the Mayflower is going to go to the new land." – student
- "I think they are going to be nice." – student
- "play outside" – student
- "When I was talking I was saying there was a shark in the ocean that might come to the boat." – student

Appendix C: Sample Classroom Observation Field Notes

Monday, November 8, 2010

21st Century Learning Skills	Notes to Self	Teacher Facilitation Moves	Observations Evidence of the environment being conducive to student learning
COLLABORATION INDICATOR: Students work together in a collaborative learning environment.	More modeling needed. It would be helpful if students did the modeling instead of the teacher always modeling. The teacher is searching for more books rather than encouraging the students to share and work together. Fewer books promotes discussion between students that are looking together. Students are supposed to sit with the squad members on the rug but when they are talking she moves them to their individual squares away from the group members.	Teacher gives reminders often. Calls attention to students sharing. Teacher abandons original plan. Teacher abandons original plan again. Teacher changes student seating to prevent further disruptions during lesson. Teacher directs students' attention to "Working Together" poster. Teacher reminds students to look at the person talking and talk to the whole group, listen to each other, only one person talking at a time. Teacher announces how one student moves over to share	Move to work in squads to look at books about weather and seasons. Teacher directs them to look for weather that happens in specifically spring and winter. "Even when the people are talking, listen to them." – student Squads are dismissed by color to go back to their table to look through books and look at pictures in books of different seasons. "Books to share." – teacher May not be enough books for everyone to have one, students will have to share books, take turns looking at the pictures.

		a book with another student.	Books passed out. "He took my book." – student Students fighting over books. "When we work in squads, you need to work together." – teacher "We are not going to have one book for each person; that means we share." – teacher Teacher looking for more books instead of encouraging more sharing and working together. "Wait! You're not next to me!" – student Teacher hangs Venn diagram (winter vs. spring) on the easel. Students are asked to sit on the rug in their squads… because of the volume and the way students go to the rug teacher changes her request and asks students to move away from their squads and sit in their individual squares.

PROBLEM SOLVING INDICATOR: Students demonstrate problem solving by considering different viewpoints, choosing solutions, and using resources to solve the unknown.	One student solves his own problem by finding information in his book so that he can contribute during whole group discussion.	Teacher walks students through problem solving when conflict arises.	"I don't have a book." – student. "What do you need to do?" – teacher One student raises his hand to offer something about spring or winter but can't think of something when he is called on. The teacher says that she can come to back to him if he wants time to think. The boy walks back to his table to look through a book and look at the pictures again.

DECISION MAKING INDICATOR: Students demonstrate decision making skills by choosing their own approach to finding solutions and by choosing resources that will assist in their learning.	Simple decision making here. No explanation from student or support for their answer. More prompting for students to support their answers is needed.	The teacher helps student provide reasoning behind his answer.	"I saw a scarecrow." – student. Do you think that was in the winter or spring? – teacher. Student- "Fall." Teacher relates that scarecrows are used on farms to keep crops safe and that corn can be grown in the spring.
COMMUNICATION INDICATOR: Students communicate effectively by speaking clearly about their topic, demonstrating active listening, and presenting information to other students and the teacher.	Many distractions, disruptions. Students need to model effective communication – not the teacher. Students appear to understand content and have good ideas to share. Students are raising their hands and participating by taking turns during the first part of the whole group discussion. Whole group discussion lasts too long. More time needed for interaction with	Lots of review of how to communicate. Teacher directs students' attention to the "Working Together" poster. Teacher reminds students to look at the person talking and talk to the whole group, listen to each other, only one person talking at a time. Teacher summarizes students' sharing. Teacher brings focus back to how it was winter when the Pilgrims came. She talks about the Pilgrims clothes. Starts discussion about hardships due	"Even when the people are talking, listen to them." – student "Last week we were talking about the pilgrims and the Indians. Let's try to remind ourselves who the pilgrims and Indians are. They each had their own set of problems that we are going to try to solve." – teacher "I know that they did helpful." – student "I know that they was going to a new land." – student "The mayflower can go to the new land." – student "They put on clothes

students. Losing attention of students when whole group instruction continues longer than it should. Classroom management and classroom routines need to be better established. Many students shouting out and their answers are being taken rather than their behaviors being corrected. Many distractions. Even the teacher seems distracted by bathroom breaks and how many children are out of the room at one time.	to winter. Teacher encourages students to talk to the people in their group.	like those" (points to a picture of a pilgrim). – student "When they was going to the new land, it was snowing out there." – student Students on the carpet. Raising their hand to share. "What do we know about the Indians?" – teacher "Indians lived in America." – student "They cooked." – student "They grew corn 1,2,3 like in our poem." – student One student whispers an answer to another student on the rug. "They were going to be nice to the Pilgrims." – student "Why was it hard to start in a new land in the winter?" – teacher "Because you could get frozen and there would be ice." – student

			"You could probably fell." – student
			"The snow makes ice and the ice melts and the Pilgrims might fall on the ice." – student
			"When it gets nice out when the springtime comes, is it easier to work outside?" – teacher
			"There's no snow on the ground." – student
			"It is warmer outside." – student
			"When the sun comes up it turns the snow into water." – student
			Student shouting out about bathroom usage and getting Kleenex.
			Student calling out teacher's name.
			Raising hand and walking towards teacher and talking.
			Many students asking to go to the bathroom.
			"This is not about

			Spring." – student
			"It's rainy." – student
			"It's summer." – student
			"There's a rainbow." – student
			"Wait! You're not next to me!" – student
			"It's summer in this book." – student
			"Look, there's a snowman." – student
			"It's winter because there are little snowflakes." – student
			"I think this book is all about summer." – student

Appendix D: Sample Problem Statements used during This Study

Unit	Problem Statement
Problem 1: Nocturnal Animals	We need your help! On Friday night, many students and teachers attended the School Fun Fair. When the fair was over, everyone left the school and walked out into the parking lot. It was 9:00 at night and very dark outside. Everyone saw garbage on the ground around the dumpster. A half eaten peach was found in the grass nearby. Many noises were heard as everyone walked to their cars and some people saw yellow, glowing lights in the trees and in the sky. A terrible smell caused people to quickly get in their cars and drive away. One girl yelled that she felt tangled in something. What happens in Evelyn at night? Please help to figure out who or what comes out during the night. Thank you for your help.
Problem 2: Friendship	Part 1: Let's pretend! It is the year 1620 and you are a Pilgrim. You are about to set sail on a ship to a new land. What will you bring with? What will you do when you arrive? Where will you live? Who will help you once you get there? Have an exciting journey! Part 2: Let's pretend! It is the year 1620 and you are a Native American. You are about to meet a group of

	visitors that have sailed to your land. What will they be like? What will they need from you? How will you help them? Have an exciting exploration!

Appendix E: Sample Index Cards

Theme: Change in Teacher's Role

Teacher does a lot of redirecting to get students organized into their squads. (O, 10/18/10, 1:15)

Conversation starts about how to work together effectively and focuses on communicating effectively. Teacher does some modeling. (O, 10/04/10, 1:15)

I'm doing a lot of reminding of… it seems like at this point in the there after a couple months you focus on their behavior so much at the beginning of the year and then you kind of sit back and then you realize that they are not sitting… especially today, I really focused on the whole group. I was going to read a story. I would say okay how do we sit, who should we be looking at, where should our hands be? So I feel like I am coming back to that, reminding them. And then I was so impressed. The groups were so good today that I was able to visit each group and focus on the positive behavior and there was a lot of that today. (I, 11/02/10, 3:00)

I modeled how to make the poster and then the children split in groups to create their own. (J, 10/06/10, 3:00)

I was able to discover my students who have leadership abilities, even some who surprised me. (J, 11/20/10, 3:00)

Teacher announces how one student moves over to share a book with another student. (O, 11/08/10, 1:15)

I didn't think my role changed too much because they are so... it is the beginning of the year and I feel like I am really trying to model everything I do and guide them. I'm realizing that I want to pull back a little more and let them kind of go and come up with their own solutions instead of guiding them so much. So far I've kind of taught as I always teach but that is something that I want to change. (I, 10/12/10, 2:30)

I like rather than just giving information to the kids. I like the fact that they have to think about it after being given pieces of information and to figure a lot of it out on their own. (I, 10/26/10, 3:00)

Appendix F: Cooked Observation Notes Providing Evidence of Problem Solving, Decision Making, Communication, and Collaboration Skills Occurring during Observations

21st Century Learning Skills	Notes to Self	Teacher Facilitation Moves	Evidence of Student Learning
Problem Solving	-Students are sharing viewpoints, listening to each other, and considering what has been shared. (O, 10/18/10, 1:15) -Some conflict between students. Teacher guides students through resolving problem without fixing the problem for them. (O, 11/08/10, 1:15) -Student uses resource to solve his own problem and find information to share with the group. (O, 11/08/10, 1:15)	-Teacher asks questions to help students rule in or rule out possible solutions. (O, 10/04/10, 1:15) -Teacher reminds students to use the charts created as a reminder of what they already know and what they are trying to figure out. (O, 10/25/10, 1:15)	-Students are thinking of possible solutions based on what they have discovered. (O, 10/04/10, 1:15) -When conflicts arise, students are solving their own problems or helping each solve problems rather than appealing to the teacher for help. (O, 11/08/10, 1:15; O, 11/15/10)
Decision Making	-Very basic decision making, lacking support and evidence. More prompting is needed to help students support their choices. (O, 11/08/10, 1:15) -Students make decisions about what they would like to share based on what they have discovered. (O, 11/15/10, 1:15)	The teacher asks guiding questions to lead students making choices as they learn. (O, 10/04/10, 1:15)	-Students are making informed decisions for which solutions to rule in and rule out based on the content learned. (O, 10/18/10, 1:15) - Students are making decisions about what to share with the whole group that will contribute to everyone understanding the problem. (O, 11/15/10, 1:15)
Communication	-More practice needed for students to listen to each other. (O, 10/04/10, 1:15) -Some students are learning to be able to	-The teacher reads the problem with enthusiasm and adds to the students becoming very excited about the	-Students are beginning to imitate modeled behaviors like raising their hands before sharing information, taking

	share with the whole group what other members of their group said during small group discussions. (O, 10/18/10, 1:15) - Classroom management and classroom routines need to be better established as student behaviors and frequent bathroom breaks often interfere with learning. (O, 11/08/10, 1:15)	problem. (O, 10/04/10, 1:15) -The teacher communicates the importance of the children helping by saying that she needs their help and by calling them problem solvers. (O, 10/04/10, 1:15) -Teacher models looking at a student that is talking. (O, 10/04/10, 1:15) -Teacher provides many reminders for how to communicate effectively in different settings (whole group, small group, partner work). (O, 10/04/10, 1:15)	turns speaking in small groups and looking at the person speaking. (O, 10/13/10, 1:15) -Students are sharing connections that they are making to other content being learned during the day. (O, 11/15/10, 1:15)
Collaboration	- More small group time is needed, less whole group instruction. (O, 10/04/10, 1:15) - A lot of time spent redirecting students and managing behaviors. (O, 10/18/10, 1:15) -Teacher abandons original plans to fit the needs of her learners. (O, 11/08/10, 1:15) -Noticed students sharing supplies and using respectful language as they worked together. (O, 11/15/10, 1:15)	-Teacher provides many reminders for how to work together effectively. (O, 10/18/10, 1:15; O, 11/08/10, 1:15)	-Students are learning how to talk to each other during small group time. They are saying "Everyone look at me" and "Okay, now you go." (O, 10/18/10, 1:15) -Students begin sharing materials and demonstrating patience with their classmates as they wait their turn. (O, 11/15/10, 1:15)

Appendix G: Initial and Emergent Themes and Examples

Themes	Examples
Collaboration	"I was amazed at how well they worked together cause they are very individual when they are working in class normally, they are just concerned about their own work and not anybody else's so I was surprised at how well they could work together. When they were given the group project to work on the night and day – things they saw at night and day – they were even helping each other in where they were going to sit around the poster so they could all get to it and complete what they wanted to complete." - teacher (I, 10/12/10, 2:30) "I do think they are working better together in groups. I see some of my higher end students volunteering to help out other students when they are struggling with whatever." – teacher (I, 10/19/10, 3:00)
Communication	One boy turns his body all the way around to look at the child speaking. Teacher points out what the boy just did and everyone turns to look at the speaker. (O, 10/13/10, 1:15) During a small group discussion one student begins by saying "You may go first." (O, 11/03/10, 1:15)
Problem Solving	"…rather than just giving information to the kids. I like the fact that they have to think about after being given pieces of information and to figure a lot of it out on their own." - teacher (I, 10/26/10, 3:00) While filling out the problem solving chart, students begin thinking of possible solutions. "it was a raccoon" – student A, "or maybe it was a dog" – student B, "Who ate the peach?" – student C, "I think it was a skunk." – student D, "they smell when they spray" – student E, "I thought it was a hawk." – student F, "there were sharp bites" – student G. (O, 10/04/10, 1:15)
Decision making	Students are making decisions in their squads about what comes out at night and fits as a possible solution to the problem. "A skunk because they really make bad smells." – student quote (O, 10/27/10, 1:15) Students are participating in small group discussions to share with their squad members what they have decided after listening to the problem. "I think it was a raccoon crawling out of the garbage can." – student A, "I thought animals search for food at night." – student B, "I think raccoons come out at night and eat fruit." – student C (O, 10/18/10, 1:15)
Teacher's role	"I'm realizing that I want to pull back a little more and let them kind of go and come up with their own solutions instead

	of guiding them so much." – teacher (I, 10/12/10, 2:30)
	"But now because I'm giving them more to do, I'm passing the responsibility on a little more." - teacher (I, 11/02/10, 3:00)
Use of multiple resources	An idea that came out of a peer debriefing discussion was to consult the social worker for resources on empathy and bullying to use during second unit. (PD, 10/28/10, 4:00)
	The use of sixth grade students to help in the computer lab and the use of computers as a source of information- "Computer Lab: Reading buddies came in to assist. Great experience. All children enjoyed! They finished the initial activity quickly, but they were able to explore the sight further since they had help." – teacher (J, 10/20/10, 3:00)
Discovery learning	"One little girl came up to me in the library today and said 'I have a new discovery.' She was telling me about how she thought bats could be out during the day too because of a picture she saw in a book." – teacher (I, 10/19/10, 3:00)
	Student Quotes: "I see a bat at night." "I see a raccoon climbing a tree." "I see an owl at a tree." "I see fruit bats." "I see a frog eating a cricket." "I see bats eating food." "I found a raccoon eating a peach." "Look at his eyes!" "Look at this!" "These are vampire bats." (O, 10/13/10, 1:15)
Social learning	"I think they are starting to become a little more cooperative. They help each other out and encourage each other a little more." - teacher (I, 10/12/10, 2:30)
	"…it's (PBL) life skills too and they do need to get along, social skills and all of that. It (PBL) helps with the social end of it. (I, 11/10/10, 12:00)
Student motivation	"…the students were split into their squads and were given the opportunity to look through books to discover more information on their own. …This proved to be the best lesson so far! The children were excited and all were engaged in the activity."- teacher (J, 10/13/10, 3:00)
	"I see an eagerness to participate. They all want to share to the point of making up stories about some of the things."- teacher (I, 10/12/10, 2:30)
Higher order thinking	Students begin questioning: "I wonder if the pilgrims are going to follow the Indians." – student (O, 11/03/10, 1:15)

	Students making connections to topic they are learning about: "I have a connection. When I was three years old I went on a boat. At first it was kind of scary." (O, 11/03/10, 1:15)
21st century skills observed in other parts of the day	"I think they are responding well because they bring it up at different times of the day when we are not working on the problem. They'll say... they'll find an animal in a book that we are reading and they'll say this is a nocturnal animal. So I see it coming to light at different times of the day when we are not even working on it." – teacher (I, 10/26/10, 3:00) "Today the children visited the library where books about nocturnal animals were available. Many children chose these books and I even heard one use our new language such as 'new discoveries' as she paged through her book." – teacher (J, 10/19/10, 3:00)
Time frame	"We realized today that maybe we need to slow down and try not to accomplish so much on one day." – teacher (J, 10/06/10, 3:00) "I thought at first it (PBL) might have been more successful a little further into the school year, however, I think they did very well. We taught them to work independently and cooperatively in small groups. This will prepare them as the year continues." – teacher (J, 11/18/10, 3:00)

Appendix H: Themes that Emerged during Data Analysis

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Interview with Teacher	-Change in teacher's role. -Using multiple resources. -Discovery learning. -Student motivation. -Social learning. -Time frame for learning.	-Change in teacher's role. -Student motivation. -Time frame for learning.	-Change in teacher's role. -Discovery learning. -Use of higher order thinking skills. -Use of 21st century learning skills in other parts of the day.	-Change in teacher's role. -Using multiple resources. -Discovery learning. -Student motivation. -Social learning. -Use of 21st century learning skills in other parts of the day.	-Change in teacher's role. -Time frame for learning.	-Change in teacher's role. -Discovery learning. -Social learning. -Use of 21st century learning skills in other parts of the day. - Time frame for learning.	-Change in teacher's role. -Using multiple resources. -Discovery learning. -Student motivation. -Time frame for learning.
Classroom level observation	-Change in teacher's role. -Use of higher order thinking skills. Student motivation.	N/A	-Change in teacher's role.	-Change in teacher's role.	N/A	-Change in teacher's role. -Using multiple resources. -Discovery learning.	-Change in teacher's role. - Use of higher order thinking skills.
Participant Observation	-Change in teacher's role.	-Change in teacher's role. -Student motivation.	-Using multiple resources.	-Change in teacher's role.	-Change in teacher's role. -Use of higher order thinking skills. -Social learning.	N/A	-Change in teacher's role. -Social learning. -Use of higher order thinking skills.
Teacher journal entry	-Change in teacher's role. -Student motivation.	-Change in teacher's role. -Time frame for learning.	- Change in teacher's role. - Discovery learning. - Student motivation.	-Change in teacher's role. -Discovery learning. - Student motivation. - 21st century learning skills in other parts of the day.	- Change in teacher's role. - Time frame for learning. - Using multiple resources. - Discovery learning. - Student motivation.	- Discovery learning - Student motivation	- Time frame for learning. - Change in teacher's role.
Researcher journal	-Time frame for	-Change in teacher's	- Discovery learning.	- Time frame for	N/A	- Discovery	N/A

entry	learning. -Change in teacher's role.	role.	- Change in teacher's role. -Time frame for learning.	learning.		learning.	

Appendix I: Sample Peer Debriefing Log

Peer Debriefing Session # _____2_____   **Date** *October 14, 2010*

Purpose:	Questions regarding:
To keep the researcher honest and focused on collecting accurate facts that will contribute to the quality of the study.	→ the methods being used in the study. → the researcher's interpretations. → the thoroughness and congruence of the study.

<div style="text-align:center">Written Log of Session</div>

The researcher and I discussed slowing down the lessons to help the teacher work at a pace that she is more comfortable with. The classroom teacher seems to be happy with the new pace and feels a little more confident teaching problem based learning.

We discussed the idea of the teacher spending more time modeling collaboration and communication so the children could work more effectively in their squads.

We also discussed how the researcher would like the teacher to incorporate 21st century learning skills throughout the day in all areas of teaching. I questioned the researcher about how the kindergarten students could learn 21st century skills if they are only working on these skills during part of the school day. The researcher expressed that ideally the students would work with their squad members throughout the day to become familiar with a collaborative learning style.

We discussed the next steps for this study. The researcher expressed how she would like for the unit on nocturnal animals to be completed by allowing the children to research possible solutions in the computer lab and design a poster with their squad members to present to the class.

I questioned the researcher about the role of the teacher. The researcher expressed some concern about the teacher feeding answers to the students. We talked about the teacher's roles and how they are different from her previous roles. The researcher wants to see the teacher waiting for students to share their thoughts. The researcher also wants to see the students engaged in finding their solutions rather than simply hearing information and recalling it later.

Appendix J: Sample Problem Statement

Dear Kindergarten Students,

    We need your help! On Friday night, many students and teachers attended the School Fun Fair. When the fair was over, everyone left the school and walked out into the parking lot. It was 9:00 at night and very dark outside. Everyone saw garbage on the ground around the dumpster. A half eaten peach was found in the grass nearby. Many noises were heard as everyone walked to their cars and some people saw yellow, glowing lights in the trees and in the sky. A terrible smell caused people to quickly get in their cars and drive away. One girl yelled that she felt tangled in something. What happens in Evelyn at night? Please help to figure out who or what comes out during the night. Thank you for your help.

                             Sincerely,

                        Your Principal