

How Does Integrating Music and Movement in a Kindergarten Classroom

Effect Student Achievement in Math.

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## Introduction

As educators we need to stimulate the minds of our students and provide an environment that is rich in learning. Teachers are always looking for new ways to enhance student learning and one way to do this is through the use of music and movement in the classroom. “Music and movement are vital to the creative educational process” (Church, 1992 p.6). By using music and movement a teacher can energize the class and help students focus. Playing music in the classroom offers many great opportunities for children. When music is played, research shows the brain is more stimulated and increases the amounts of information that is retained and recalled. Music also provides students with strategies to increase their memory and strategies to improve math skills. “Unless students master proportions and the ability to create, hold and manipulative objects and places, they’ll be stuck having to master proportions every bit of math by memorization” (Jensen, 2005 p.30). Movement also plays an important role in a student’s learning, as it influences brains in a positive way, keeps students alert and ready to learn and keeps students actively engaged. “When we keep students active, we keep their energy levels up and provide their brains with the oxygen-rich blood needed for highest performance” (Jensen, 2005 p.66). “Music actively involves students in learning and helps develop important academic skills” (Johnson & Edelsen, 2003 p.1).

### *Purpose Statement*

The purpose of this study was to document the effects of student achievement when music and movement were integrated in the math curriculum in a kindergarten classroom. The specific questions that the researcher attempted to answer included: Does music and movement have positive effects on student’s achievement in the kindergarten

classroom? How did students feel when music was played and movement activities were done before formal math instruction? How did participation in music and movement activities affect the student's attitude toward math achievement?

### *Importance of Study*

The study will provide valuable information on the effects of music and movement in relation to math instruction in the kindergarten curriculum.

The information will provide valuable insight to administrators, teachers and the school improvement committees in regard to the importance of using music and movement in the classroom to enhance learning in math and other areas.

### *Definition of Terms*

*Cognitive:* The process of knowing and more precisely, the process of being aware, knowing and thinking (Brown 2001-2003).

*Brain Compatible:* Educators that weave math, geography, social skills, role-playing science and physical education together, along with movement and the arts (Jensen, 2005).

*Math manipulatives:* Any physical objects (blocks, toothpicks, coins) that can be used to represent or model a problem situation to develop a mathematical concept (Marzola, 1987).

*Mnemonic devices:* Techniques that help you remember something (Mastropieri and Scruggs, 2000).

*Multi-Sensory:* Using as many senses (sight, sound, tactile, kinesthesia, speech) as possible to teach the desired information (Lazar, 2002).

*Spatial-temporal reasoning:* The brain has the ‘where’ pathways that constantly map locations that are important to us we call this form of memory “spatial” or “episodic” (Jensen, 2005).

## Review of Literature

“Music and movement are vital to the creative educational process. We enable the whole child to grow emotionally, creatively, socially and cognitively” (Church, 1992 p.6). The purpose of the research was to identify strengths that music and movement brings particularly in the area of math for kindergarten students. The research contains information on benefits of music, music and the brain, benefits of movement, movement and the brain, music, math and the brain.

### *Benefits of Music*

“Music is an universal language central to every culture of the world. Research evidence now suggests that the musical arts central to the cognitive process and dramatically impact the functions and systems responsible for all learning. Music reduces mental fatigue, calms tension, focuses thinking and greatly impacts creativity and sensitivity” (Brown, 2001-2003 p.1).

According to Perret & Fox (2004), a series of research findings have suggested music is an important part of a young child’s growth and development. Music can positively affect the quality of all children’s lives. Through creative expression in rhythmic movement and listening experiences, music can help children emotionally and intellectually. Musical experiences should be a daily routine for all children. These experiences should be planned for different types of learning opportunities and with other subjects (MENC Music Educators National Conference, 2008).

According to (Brewer, 1995), the three areas of teaching where music can be effective integrated: 1) Learning information-music can help us remember, especially if put to rhythm and rhyme. 2) Attention, attitude, atmosphere-music can help us be more

motivated and lead to a positive attitude. 3) Personal Expression-music can help in the areas of writing, art, movement and many other projects. Music greatly enhances children's learning and living.

(MENC, 2008) MENC states that music is important to all programs for Early Childhood that meets all the expressive, intellectual and creative needs of all children. Music helps us learn because it will: establish a positive learning environment, create a desired outcome, build a sense of anticipation, energize learning activities, and change brain wave state (Brewer, 1995). Research continues to be conducted to provide helpful guidelines for the use of music especially in the classroom. The use of music in the classroom will help set the scene for learning "Certain techniques for the classroom teacher to orchestrate a classroom environment that will provide learners with a symphony of learning opportunities and a sound education" (Brewer, 1995 p.1-2).

Music is often an integral part of the preschool and kindergarten child's school experience by serving as a method to teach certain curriculum units. Music is looked at as a multi-sensory approach to enhance learning and retention of academic skills. According to Lazar (2002), teachers can ensure that music activities are not being taken away from "academic" time by: 1) Musical activities need to be considered another type of instructional approach like manipulatives and worksheets. 2) Music activities need to be used to specifically teach curriculum content that the students learn. 3) Music can be used to provide an introduction to stimulate interest in different subjects. "As one's base of prior knowledge grows, interest and learning becomes easier and a positive cycle is established" (Harris, 2002 p.1).

The author MacDonald (n.d.) chooses songs that can teach reading, writing, math and science, because of the information each song presents. The following are six elements of what to look for in songs:

- 1) They are relevant, meaningful, and interesting to the children.
- 2) They have a simple, memorable melody.
- 3) They build a base for future learning.
- 4) They review information and practice skills.
- 5) They tell a simple story.
- 6) They are age appropriate.

Songs help young children learn information quickly and accurately.

Through songs, children store, retrieve and access information more quickly (MacDonald, n.d.).

“Children learn more readily when they’re happy, then it’s up to us teachers to make a more pleasant positive classroom atmosphere” (Mendlesohn, 1990 p.7). Most children love music. A song brings the concepts of a lesson and helps students remember what they’ve learned. Music and song stimulate creativity and help provide a positive attitude towards school (Harris, 2002). For thousands of years, people have used songs for enjoyment and to ease the burdens of work (MacDonald, n.d.).

Music can bring people together through shared experiences; it can remind us of special times, comfort us and bring us pleasure and joy (Warner, 1999). He also states that children feel more successful when they participate in musical activities. Singing, dancing, moving can help brighten children’s moods.

*Music and Math*

“Math and music do have much in common. Patterns in our world can be expressed in symbolic language, which is common to both math and music” (Harkleroad, 2006 p.1). Classroom Compass, (1998) states: that patterns can be found everywhere especially in music. An example to address patterns is to have students stand in a circle and listen while the teacher claps a rhythm-pattern. Each student must then copy the rhythm one after another until it goes around the entire circle correctly. Use a familiar tune to remember various counting patterns. For examples: count by 3’s to the tune of “Jingle Bells”, 4’s to the tune of “ Old McDonald”, 6’s to the tune of “ I’m a Little Teapot”, etc. (Lazar, 2002).

To quote the nineteenth-century mathematician J. J. Sylvester, “May no music be described as the mathematics of sense. Mathematics as music of the reason the soul of each the same!” Mathematics and music go back a long way together. The Pythagoreans explored a connection between math and music over 2500 years ago. “The interplay between math and music continues at present” (Harkleroad, 2006 p. 3).

Unfortunately integrating mathematics and music in lessons are encouraged but rarely done. “Music actively involves students in learning and helps develop important academic skills” (Johnson & Edelsen, 2003 p.1). “Using music to enhance children’s enjoyment and understanding of mathematics concepts and skills, teachers can help children gain access to math through new intelligences” (Johnson & Edelsen, 2003 p.1).

Many math concepts relate closely to musical concepts and teaching them together can enhance learning. Karin Nolan a MENC member who is an arts- integration specialist collaborates with other teachers to create musical ways to teach different

concepts (MENC, 2008). Many teachers use songs to teach math lessons with great success and enjoyment. According to Brown, (2001-2003) music simply makes learning easy and more fun! Brown provides an example of how to integrate music and math:

- a) Graph favorite characters, favorite parts of a song, interesting facts and etc.
- b) Tally the number of characters in words and etc.

“Music activates most places in the brain, for example there is a positive relationship between music and math” (Jensen, 2002 p.11).

### *Benefits of Movement*

“ Let us first teach little children to breathe, to vibrate, to feel, and to become one with the general harmony and movement of nature. Let us first produce a beautiful human being, a dancing child” by Isadora Duncan (Church, 1992 p.5).

Hap Palmer (2001) believes that young children have billions of neurons that are just waiting to be stimulated. Music and movement offer children rich and varied learning experiences. He also believes that teachers should work with children’s natural desire to move and be actively involved. Combining music and movement invites children to get out of their seats and experience the world through active engagement. “Strong evidence supports the connection between movements and learning” (Jensen, 2005 p.67). He also states that there is a strong relationship between motor and cognitive processes.

According to Weikart (1998) there are four key elements in movement:

- 1) moving the body in coordinated ways
- 2) acting directions in different modes of learning
- 3) feeling and expressing beat and
- 4) expressing creativity in movement

Palmer (2001) states, music and movement combined with rhythm, melody, lyric, motion affects many of the areas children love. While children are having fun, important learning is taking place. Musical elements are introduced such as rhymes, rhythm and repetition.

Some songs that introduce elements of movement and music:

- “The Elephant”
- “Everybody Dance”
- “Head, Should, Knees, Toes”
- “If Your Happy and You Know It”
- “I’m a Little Tea Pot”
- “I’m a Pretzel”
- “Itsy Bitsy Spider”
- “Looby Lou”

“A vital part of the music, movement and learning connection is the realization we are all songwriters” (Palmer, 2001 p.2).

### *Movement and Math*

“ We live in a musical rhythmic world. Sounds, patterns and movement are all around us” by Ella Jenkins (Church, 1992 p.6). According to Classroom Compass, (1998) there is a long tradition of using rhythm to teach math. The ancient Greeks have recognized the connection between music, movement and math. Today scientists are also linking them too. Music through action motivates most students. They learn to work out mathematical meaning in new ways. Many people have long noted the close relation between movement and music (Classroom Compass, 1998).

“The simple song “ This Old Man” incorporates many basic math skills, including matching and comparing; patterning and sequencing; and counting and addition. When you add moving to the beat, you involve both body and mind” (Church, 2001 p.1). By practicing movement and rhythm together as a cooperative learning group, you can teach children to work together in other learning group situations such as math (Classroom Compass, 1998).

### *Music and the Brain*

“Music gives a soul to the universe. Wings to the mind. Flight to the imagination. And life to everything” —Plato (Woodall & Ziembroski, n.d. p.2). Learning through music is certainly effective because it is completely brain-compatible. Music provides meaning and relevance and can help in long term learning process. “More than 80% of all information processed by the brain comes through our ears” (Brown, 2001-2003 p. 1). Brown also states that brain function is increased when listening to music and leads to complex thinking. Connections between emotions, thinking and learning, can happen when listening to music, according to (Woodall & Ziembroski, n.d.)

Howard Gardner’s research on Multiple Intelligences supports this idea. In his first book, ‘Frames of Mind’ (1985), Gardner identified seven “intelligences”; recently he has added an eighth intelligence. “An ideal school gives all students experiences of learning in many different intelligences” (Classroom Compass, 1998 p.4). Music not only promotes the development of Multiple Intelligences as defined earlier by Howard Gardner, but also offers other cognitive benefits, such as helping children symbolic understanding, sense of sequence and memory (Classroom Compass, 1998).

Therefore, classrooms must provide different approaches to meet an individual student's area of strength in order to be the most successful. Using rhythm, chanting and songs with students can increase their attention and interest while motivating them to learn (Woodall & Ziembroski, n.d.).

There are many ways that music assists our memory processes. Musical sounds hold our attention and take in more information in this focused state. The more senses we involve in our learning the greater our understanding. As teachers, we can increase sensory input during learning by using music intentionally during memory activities. (Brewer, 1995) Brewer also indicates that one of the elements that makes music so powerful in our life experiences is the way it helps us remember events. Music triggers us into re-experiencing particular moments in time. We can use music memory techniques to help student retain more information and provide them with different ways to retrieve information (Brewer, 1995).

The use of music in the classroom is another way of providing multi-sensory learning. Cognitive psychologists have confirmed what educators have long known-that we need to provide different avenues of learning. Music is one such avenue (Harris, 2001). Research suggests that the more senses we use, the stronger degree of learning. While music is auditory, clapping, dancing and moving about can activate the kinesthetic modality. Harris (2001) believes that music can definitely help focus a learner's attention. Memory is engaged, because music is sequenced which helps us to recall memories. (Jensen, 2000) "Recent research on the effects of music on the brain reveals that the brain loves music and the information travels on musical notes is learned more quickly and better retained for speedy retrieval" (MacDonald, n.d. p.1).

(Lazar, 2002) states that research supports using music as a mnemonic device for the learning can help recall new information. Music also plays an important role in keeping student's attention and providing a motivating environment for learning. In addition, educational research shows that when we find information interesting and meaningful we learn and retain information better. Harris (2001) believes like Lazar (2002), that music can function as a mnemonic device to aid in the recall of information. For example, when we use the saying: "In fourteen hundred and ninety-two, Columbus sailed the ocean blue."

"Music increases the brain's capacity by increasing the strength of connections among its neurons" (Weinberger, 1997 p.6). Perret & Fox, (2004) believe that music affects the brain by:

- 1) becoming a tool for non-musical reasoning
- 2) solving nonmusical problems.

"Music as a technique in your classroom will add richness and improve the learning process" (Brewer, 1995 p.8). "Your native tongue is a language; mathematics is a language; and to an extent emotions are a language; music should be considered a major discipline and a place among the ranks of critical subjects" (Jensen, 2000 p.4).

#### *Movement and the Brain*

"Exercise may grow a better brain" (Jensen, 2005 p.63). The brain processes movement in the same part of the brain that processes learning. Jensen further believes that physical activity is a way to increase blood flow and oxygen to the brain. Exercise strengthens all key areas of the brain. Some studies suggest that students will boost

academic learning from games and so called “play” activities as play-oriented movement can improve cognition (Jensen, 2005).

Studies provide evidence that many years of fine motor exercise allows brain reorganization and nerve growth. Physical movement such as standing, stretching, walking or marching can help the brain focus better. For instance, if students feel drowsy, they should be allowed to stand at the back of the room for up to two minutes and stretch on their own. Cross-lateral movements are especially helpful in activating the blood flow in the brain (Jensen, 2005). “Evidence that there is a strong connection between physical education, movement, energizing activities and improved cognition” (Jensen, 2005 p.60). Jensen believes that movement can be an effective strategy to:

1. strengthen learning
2. improve memory and retrieval
3. enhance learner motivation and morale.

Movement should be an important part of the school day, as movement can influence the brains of students. “Today, most neuroscientists agree that there is a connection between movement and cognition” (Jensen, 2005 p.61). Movement should be a part of all subject areas of the curriculum. Physical activities like role-playing, doing hands on activities, such as math manipulatives are likely to be recalled. “When we keep students active, we keep their energy levels up and provide their brains with the oxygen-rich blood needed for highest performance” (Jensen, 2005 p.66).

#### *Music, Math and the Brain*

“Math and science tend to be stronger in students who have music or an arts background” by D’Arcangdo 1998, (Jensen, 2000 p.25). Spatial-temporal reasoning skills

are crucial in learning certain math concepts. The value of music to spatial reasoning, creativity and other mathematical skills has long been established (Johnson, 2003). Jensen (2005) also believes that music strengthens the spatial-reasoning essential to math skills. Key math areas of the brain overlap with areas highly involved with music. Research suggests that music often leads to the higher brain function typical of math. Music has a rhythmic quality to it that makes it easy to remember (Jensen, 2000). “Music not only supports the development of math skills but of all skills for all kinds of students” (Church, 2006 p.34).

Research proves that music and movement are vital components in developing and enhancing student’s performance in the area of math. “If music can set the stage for learning, increase a child’s interest and activate a student’s thinking what are we waiting for?” (Woodall & Ziembroski, n.d. p.2).

### Methodology

The methodology section of the research paper includes the participants of the study, the materials used, procedures followed and the analysis of the data.

#### *Participants*

The study took place in a rural mid-western community with a population of 3619, 95% Caucasian, 3% Hispanic and 2% other. The population of the school was comprised of 496 K-6 students, and 45 staff members. The school population had an ethnic make-up of 92% Caucasian, 7% Hispanic and 1% other. The largest subgroup being Caucasian. Thirty-four percent of the K-6 students receive free and reduced lunch. Title One services for both reading and math are offered K-6. The kindergarten students range from ages 4-7. There were 74 kindergarten students enrolled for the 2008-2009

school years. In the researcher's class there were a total of 18 students, nine boys and nine girls. There were 95% Caucasian and 1% Hispanic kindergarten participants. Students receiving special education services is 2%, whereby the special education teacher came into the classroom for reading and math for a total of 60 minutes a day. These same students were retained from last year. Of these students, 1% also received speech services and 1% of the students received help from an occupational therapist once a week.

Before the research was conducted, the researcher sought approval from the Institutional Review Board, as required by the learning institution the researcher attended prior to initiating the study. Approval was also received from the principal where the researcher was employed as well as, from the parents and guardians of the students involved in the researcher's study. The researcher began the study in late August of 2008 and continued through the month of December of the same year.

### *Materials*

Permission slips and parent letters were given to parents at Parent Teacher's Conferences (see Appendix A). Students were given a survey at the beginning and end of the program to determine their attitudes towards music (see Appendix B).

The math curriculum that the school district requires the researcher to use in the kindergarten classroom was Saxon Math, which has been used for three years. Formal instruction of math was presented to kindergarten students for 30 to 45 minutes each day. Each morning on a daily basis, calendar activities addressed math skills in the study. There was also a math center daily during learning center time, whereby specific mathematical concepts were worked on. Throughout the day, music was played which

included a variety of math songs. Songs were played as background music as well as played to help teach certain math skills addressed in this study. Books about particular math concepts were read periodically throughout the study. Activities on movement and math were incorporated into regular math instruction daily.

Measuring devices included student surveys (see Appendix B), oral questionnaires, anecdotal observation notes, and daily journal entries kept by the researcher, Saxon math pre- and post assessment tools (see Appendix C), checklists created by the teacher or from other resources (see Appendix D), and quarterly report cards used by the school district for kindergarten (see Appendix E). Materials used in the research project included songs incorporated into the math curriculum (see Appendix F), samples of the Saxon Math worksheets completed by students (see Appendix G) and examples of the music and movement activities (see Appendix H).

### *Procedure*

Prior to the beginning of the researcher's study the proposal was approved by the Institutional Review Board. Permission was also granted from the researcher's principal, special education teacher and parents/guardians of the students involved in the study (see Appendix A).

The length of the study was from the month of August 2008 and continued through the month of December 2008. Each participant was assigned a number to provide anonymity for any surveys done for the duration of the study. Parents were given a parent consent form for their child's information to be included in the study (see Appendix A). Students completed a survey at the beginning and the end of the study regarding music

and movement in the classroom (see Appendix B). The researcher read and recorded answers to the surveys when given to the kindergarten participants.

The researcher utilized the data collected from student surveys (see Appendix B), oral questionnaires, anecdotal observation notes, daily journal entries kept by the researcher, Saxon math pre- and post assessment tools (see Appendix C), checklists created by the teacher or from other resources (see Appendix D), and quarterly report cards used by the school district for kindergarten (see Appendix E).

A variety of music and movement were implemented into the daily routine, calendar time and especially during formal math instruction in order to enhance the learning of kindergarten students. Most songs (see Appendix F) played were related to each mathematical concept that kindergarten students were learning.

Every day, at the beginning of the day, students would sit on the rug at the back of the room and participate in calendar activities. The days of the week sung to the tune of the “Adam’s Family” (see Appendix F) and another days of the week song to the tune of “Aloulette” (see Appendix F). The “Macarena Month” song and other month songs (see Appendix F) were played and the students sang and performed the movements to go along with the songs.

During formal math instruction using the Saxon Math series, various songs were played before instruction started. If the students were learning about numbers the researcher would play for example the “Number March” or other related songs (see Appendix F). If the concept being learned were shapes, then the researcher would play for example the song “Shaping Up With Shapes” (see Appendix F). Students then participated by singing and doing the actions to the music.

After the music and movement activity were completed, the daily Saxon worksheets were passed out and completed by each individual student utilizing guided practice and independent practice. The researcher walked around the room and monitored student's work. The worksheets that pertained to the concepts being studied in the research project were collected and assessed (see Appendix G).

Throughout the day, other songs related to the mathematical concepts that the study looked at, were played and the students did actions, such as clapping, to the songs. During the school day, songs (see Appendix F) were played as background music, while students were working, for example drawing or coloring. The following are the mathematical concepts the researcher studied during the research project: number recognition 1-20, writing numbers 1-20, rote counting (counting numbers 1-10), days of the week, months of the year and shapes (square, triangle, rectangle, and circle).

At the beginning and the end of the study, the researcher gave a survey (see Appendix B) to the students about their attitudes toward music in general and music played in the classroom. Each student would come up individually to the researcher's desk and the researcher would read the questions on the survey and record their answer.

The pre and post Saxon Assessments (see Appendix C) were given to each individual student at the beginning of the school and at the end of the study. The teacher in the Title One room administered each assessment and the answers were recorded on the individual Saxon Assessment Form. These forms were then given to the researcher. Throughout the study, students on an individual basis were assessed using various assessment checklists, such as "Days of the Week" (see Appendix D). Answers were recorded accordingly.

When students were participating in music and movement activities, the researcher collected anecdotal observations. As students completed their Saxon worksheets (see Appendix G), the researcher collected the worksheets to assess how the students were doing while music and movement were incorporated into the math curriculum. Reflective notes were kept in the researcher's journal. The researcher monitored the progress of each individual student in regards to the skills being studied. The researcher used the data collected to determine if music and movement improved certain math skills and proved beneficial to the kindergarten math program.

### *Analysis*

Pre and post data was disaggregated to look for changes that occurred over the four month period. The first part of the data collected was the pre and post surveys (see Appendix B) and oral questionnaires. The second part of the data collected was the researcher's anecdotal observations notes and journal entries by the researcher. The last part of the data collected was pre and post math assessment tool; various checklists created by the teacher and from other resources and quarterly report cards (see Appendices C, D and E)

The researcher gathered qualitative data through the following assessment tools. Pre-and post- math assessments given to the students by the Title One teacher (see Appendix. C). Checklists created by the teacher and from a teacher's resource that were given randomly throughout the research project (see Appendix D) Lastly, a quarterly report card, district created and approved (see Appendix E).

Pre and post surveys given to the individual students as the researcher asked questions and recorded answers (see Appendix B). Oral questionnaires, asked by the

researcher to the student during activities, were incorporated into the findings. The researcher wrote anecdotal notes, which were used as a reflection tool throughout the four-month period and used to complete the quantitative data of the research project

The researcher collected the data to formulate a picture of the results gathered. The data provided the researcher with insight into how integrating music and movement in the math curriculum affect student achievement in the kindergarten classroom.

### Findings

The researcher documented the implementation of music and movement into the math curriculum in the kindergarten classroom. The researcher utilized student surveys, oral questionnaires, anecdotal notes, daily journal entries, Saxon pre and post math assessments, miscellaneous checklists and the district wide quarterly report card, to collect and investigate information.

The evaluation was divided into seven sections with the intent to collect the data to arrive at conclusions regarding the effects of music and movement on kindergarten students when integrated into the math curriculum. The mathematical concepts that the researcher studied were: number recognition 1-10, writing numbers 1-10, rote counting 1 to 10, days of the week, months of the year and basic shape recognition (square, triangle, rectangle, and circle).

The first section utilized surveys pre and post, to determine student perspective and attitudes relating to music and movement in general and more specifically, towards the use of music in a classroom and overall learning. The second section incorporated the use of giving oral questionnaires to the students randomly throughout the study. The researcher recorded student responses. The third section was the researcher's anecdotal

notes. The fourth section was the daily journal entries kept by the researcher. The fifth section involved giving each student a pre and post Saxon math assessment to provide the researcher with prior knowledge and information gained. The sixth section was the miscellaneous checklists that were either created by the researcher or from one of the resources utilized by the researcher. Checklists were used at the beginning and at the end of the study to provide the researcher with information on the progress of each individual student. The seventh section was the district wide quarterly report card used in the kindergarten classroom.

*Section One: Student Surveys on Music and Movement at Home and in the Classroom*

The data was collected from students in a kindergarten classroom as shown in the figure below. The researcher looked at changes in the data with an increase or decrease in “yes” responses.

Table 1

*Responses of Kindergarten Students Who Participated in Music and Movement*

<b>Survey Question</b>	<b>August Yes Responses</b>	<b>December Yes Responses</b>
1. Do you like to sing?	16/18	18/18
2. Do you sing at home?	16/18	18/18
3. Do you like to dance?	15/18	15/18
4. Do you think you learn from songs we sing at school?	18/18	18/18
5. Do you like to sing at class?	18/18	18/18
6. Do you like to move when you sing?	17/18	17/18
7. Does music make you feel good?	16/18	18/18
8. Do you work well when music is played in the background?	16/18	18/18
9. Do you feel good when you get up and move about?	17/18	17/18

Eighteen students participated in music and movement activities in the kindergarten classroom. These students were given a survey in August and in December. The following were results for each question:

- Question 1: Do you like to sing? In August 16 of 18 students stated they liked to sing compared to 18 of 18 students in December.
- Question 2: Do you sing at home? Students that liked to sing at home increased from 16 to 18 students from August to December.
- Question 3: Do you like to dance? The number of students who liked to dance stayed the same with 15 of 18 for both August and December.

- Question 4: Do you think you learn from songs we sing at school? “Yes” responses for learning with songs in school were the same with 18 of 18 for both months.
- Question 5: Do you like to sing in class? Singing in class for both months stayed the same, with 18 of 18 students saying “yes”.
- Question 6: Do you like to move when you sing? Responses of 17 of 18 students said “yes” for both August and December.
- Question 7: Does music make you feel good? There was an increase of 2 students from August to December.
- Question 8: Do you work well when music is played in the background? 16 of 18 students said, “yes” in August and 18 out 18 said, “yes” in December.
- Question 9: Do you feel good when you get up and move about? The number of students responding “yes” increased from 17 of 18 in August to all students in December.

### *Section 2: Oral Questionnaires to Kindergarten Students*

The researcher throughout the study randomly asked 18 kindergarten students questions pertaining to music and movement in the classroom. The following were examples of some of the questions and student responses:

- Question 1: Do you like this song and why? (Dr. Jean Counting Numbers 1-20)  
Student 2 response: “Yeah, it’s fun to sing”  
Student 13 response: “Yep, but I like the other song better.”  
Student 8 response: “Sure, I like this song.”

- Question 2: How do you feel when you listen to songs?

Student 7 response: “Good.”

Student 18 response: Happy!”

Student 2 response: “It’s fun to do songs.”

Student 11 response: “Okay.”

- Question 3: Do you like to dance and move around the classroom?

Student 18 response: “ Sure, I really like to do the marching song.”

Student 5 response: “Dancing is fun”

Student 3 response: “Na, not really”.

- Question 4: Do you think this song will help us count? (Jack Hartman’s ‘Let’s Do the Number Rumba’)

Student 7 response: “Yeah, I like it.”

Student 1 response: “I don’t know.”

Student 8 response: “I can count to 100.”

### *Section 3: Anecdotal Observations of Kindergarten Students*

Throughout the study, the researcher took anecdotal notes on each student on how they responded to music and movement in the classroom. Here were samples of what the researcher observed in August and then again in December.

- Student 1: In August, student 1 stood behind his chair doing little moving about. He sang softly along with the songs and did little movement when he was the song leader. In December, he continued to stand behind his chair, doing little moving, but singing louder to familiar songs when he was the song leader.

- Student 2: In August, she danced, moved around and sang throughout the school day, even when we weren't formally singing. When she was the song leader though, she didn't dance around much. In December, she continued to dance and move throughout the day and when she was in front of the class being the song leader.
- Student 3: In August, she was quiet and shy when doing anything in the classroom. She cried for her mom almost everyday and didn't participate in moving about or singing songs. She needed to be close to the researcher when she was the song leader and didn't sing or move around. In December, she wasn't crying for her mom anymore, and actually sang and danced to the music, especially with a friend. Being the song leader she sang quietly and didn't need to stand by the researcher,
- Student 4: In August, she was very loud and energetic. She sang loudly and liked to move around a lot. In December, she continued to be outgoing in all she did especially when singing and dancing and enjoyed being the song leader.
- Student 5: In August, he listened to the music, but rarely sang along with the music and didn't dance. He did move around a lot but not when it was appropriate with what the class was doing. In December, he has been more attentive with the songs and the movements that are suppose to be done.
- Student 6: In August, she loves to sing and dance and especially acts like she enjoys being in front of the class leading the music activities. In December, not much has changed as she continues to love music.

- Student 7: In August, he was very slow moving and rarely participated in any of the activities done in the classroom. He needed lots of encouragement to participate in the movement and music activities. In December, he was singing, moving around some didn't need as much encouragement to do activities. He was smiling more and looked like he was having more fun.
- Student 8: In August, he was very quiet and reserved, yet sang and moved about. He was always excited to be the song leader, but then sang quietly. In December, he was less reserved appearing more confident when being the song leader.
- Student 9: In August, he moved about even when there wasn't music and he should have been in his seat. He seemed to truly enjoy all the music. In December, he continued to act like he enjoyed music by dancing and moving about when it was more appropriate.
- Student 10: In August, she appeared to enjoy dancing and singing. She was especially good at being the song leader and looked forward to all the singing and moving around the room. In December, she continued to love all kinds of songs and dancing, She was always asking to do a particular song.
- Student 11: In August, she needed a great deal of encouragement to participate in singing and moving activities. She was not normally shy; but seemed to dislike singing in the classroom. In December, not much had changed as she continued to need a push in doing the activities of singing and moving about. It helped when she had a friend to do the movement activities.
- Student 12: In August, she seemed to really enjoy all kinds of music. She was always humming or singing songs and frequently requested to listen to music

while she was working at her table. In December, she kept singing and dancing, even when there wasn't music being played.

- Student 13: In August, she was quite shy and reserved, not really participating in any of the movements and sang very little, although she seemed to enjoy watching the other students doing the activities. In December, she was much more outgoing and participated in more of the activities, although at times just watching others.
- Student 14: In August, she was a quiet, but appeared to enjoy listening to the music without participating in the moving activities. In December, she was more outgoing and more likely to participate in the music activities. She got excited when she was the song leader.
- Student 15: In August, he was very quiet and shy. He rarely participated in any of the movement and music activities. He did however enjoy being the song leader. In December, he appeared to enjoy singing more, yet doesn't like to dance around much. At center time he listened to tapes of music and books.
- Student 16: In August, he liked to participate in all classroom activities. He belongs to a religion that doesn't listen to music or allow dancing. But this hasn't kept him from joining in with singing and moving around. He will remind the researcher on occasion that he wants to listen to a certain song. In December, he still liked to listen to music and do all kinds of movements,
- Student 17: In August, he enjoyed listening and singing along with the music played in the classroom. In December, he continued to love music and doing all the movements.

- Student 18: In August, he enjoyed listening to all kinds of music. He suffers from a disease that sometimes limits his ability to participate in all the movements, but he never complained. In December, he still loved all the music and movement activities that were done in the kindergarten classroom.

#### *Section 4: Daily Journal Kept By the Researcher*

Throughout the study, the researcher kept a daily journal of observations and conversations of the kindergarten students pertaining to music and movement. The following were examples of journal entries from August through December:

- August 27, 2008: The researcher observed Student 5 not participating at all during any of the music or movement activities. Most of the other kids were up and moving and clapping along with the song and he chose to sit at his desk not focused on what the rest of the class was doing.
- Sept. 9, 2008: The researcher encouraged Student 7 to get up and move around. The student appeared tired or uninterested in the movement activity. Other students were singing and moving around the room, some more than others.
- Sept.15, 2008: Student 7 was the song leader for the day and basically just stood in front of the class not singing, but pointed to the songs. The researcher tried to encourage him standing up in front with him, which seemed to help a little. We did the song “ 5 Little Hot Dogs” and the other kids went nuts clapping and doing the actions to the song wanting to do it over and over. Student 7 was not that enthused, but was willing to pick the “hot dogs “(students) that popped out of the pan in the song.

- Sept. 16, 2008: The researcher read the book “ Hippo Harvest” a counting book, and did a movement activity with it. The students listened intently to the story and did the activity. All students wanted to make sure they had a turn acting out the story.
- Sept. 22, 2008: Student 7 did jumping jacks with our morning song! The researcher overheard two of the students say how they loved doing songs and being the song leader on our ‘Job Spider’.
- Sept. 25, 2008: Student 5 needed some encouragement to leave his seat and do the movements. This student had a lot of energy, but sometimes doesn’t use this energy to do the appropriate movements. The researcher hopes to channel his energy into doing the activities that the rest of the class are doing.
- October 6, 2008: The researcher was happy to hear some of the students singing the “Days of the Week” song when they were in centers playing teacher and doing the calendar.
- October 22, 2008: Student 7, who was usually very quiet and reluctant to participate in doing the actions of songs, actually did the actions for ‘Macarena Math’.
- Nov. 14, 2008: Students were showing their knowledge of shapes by doing the ‘Shape Song’. Students that struggled earlier with recognizing shapes were now able to identify more shapes.
- Nov. 11, 2008: The researcher noticed Student 7 starting to do more music activities and actions with the other students. He even said, “yeah, I like this song, can we do it again!” He was referring to the ‘Alligator/Monkey’ counting song.

- Nov. 18, 2008: The researcher heard one of the students singing the “Macarena Months” song while she was working at her seat.
- Nov. 24, 2008: The researcher had the students count forwards and backwards with the song and all the students participated in the activity.
- Dec. 12, 2008: Students were working on counting by ones, fives and tens. While working on the math worksheet they would sing the song to help them.
- Dec. 4, 2008: The researcher jumped for joy as she observed Student 7 actually got excited and did the ‘Days of the Week’ song with the whole class!
- Dec. 15, 200: One of the students kept requesting the song “Ants Go Marching” as we had just finished reading the book and acted out the story with music the day before. The researcher played it again and the class acted it out.
- Dec. 19, 2008: The researcher reassessed the students for the two skills of ‘days of the week’ and ‘months of the years’. Many of the students sang the two songs that we did in calendar for the days of the week and months of the year, to help them remember them.

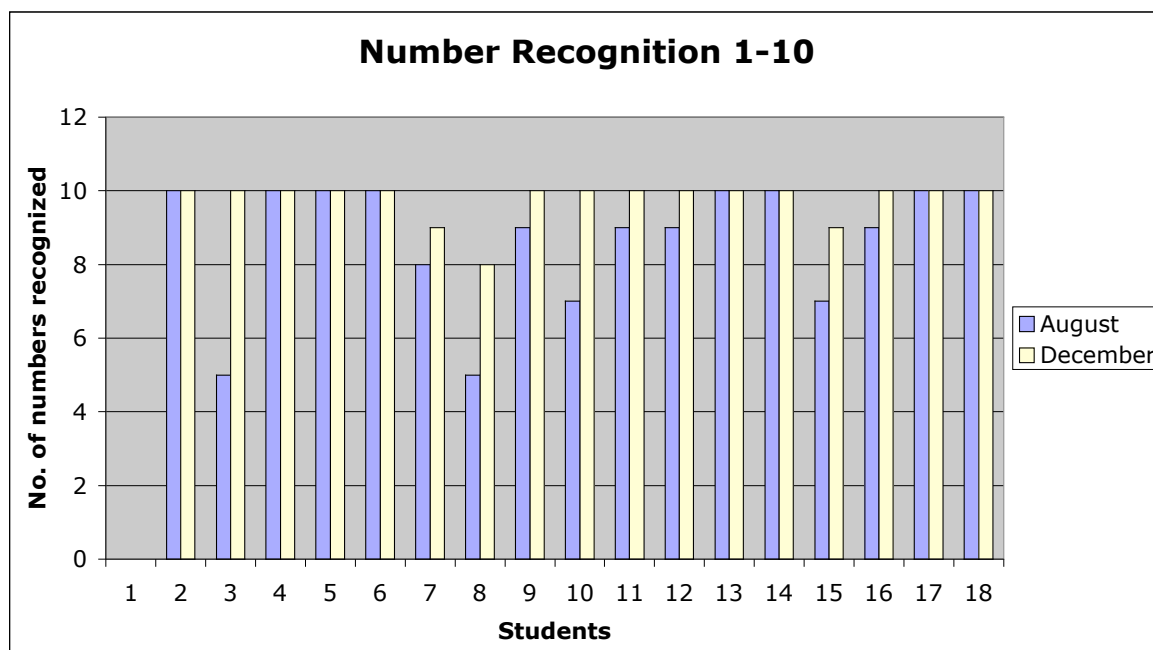
### *Section 5, Pre and Post Saxon Math Assessments*

In August, kindergarten students were given the Pre Saxon Math Assessment by the math Title I teacher and results then were given to the researcher. The skills listed on the assessment and the ones the researcher used in her study are as follows: number recognition 1-10, rote counting to 100 and recognizing basic shapes (circle, square, rectangle, triangle). In December, the Post Saxon Math Assessment was administered by the special education teacher and results shared with the researcher. The pre and post data collected by the researcher are on the following Figures:

### *Student Data on Number Recognition 1-10*

Data was collected from the kindergarten students who participated in music and movement activities in the classroom (see Figure 2).

**Figure 2** Distribution of Student Responses for Number Recognition 1-10

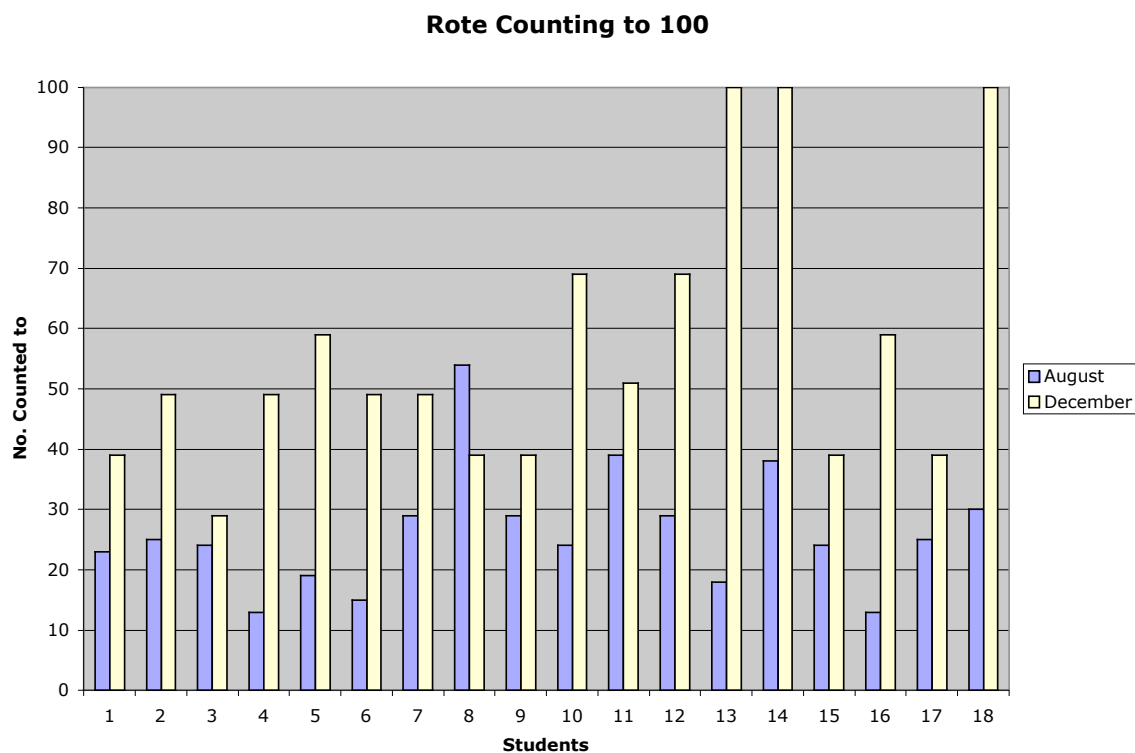


Kindergarten students were assessed in August and then in December on number recognition. In August, there were eight students that recognized all numbers 1-10. In December, there were 14 students that were able to recognize number 1-10.

### *Student Data on Rote Counting*

Data was collected from the kindergarten students who participated in music and movement activities in the classroom as shown below in Figure 3:

**Figure 3** Distribution of Student Responses for Rote Counting to 100

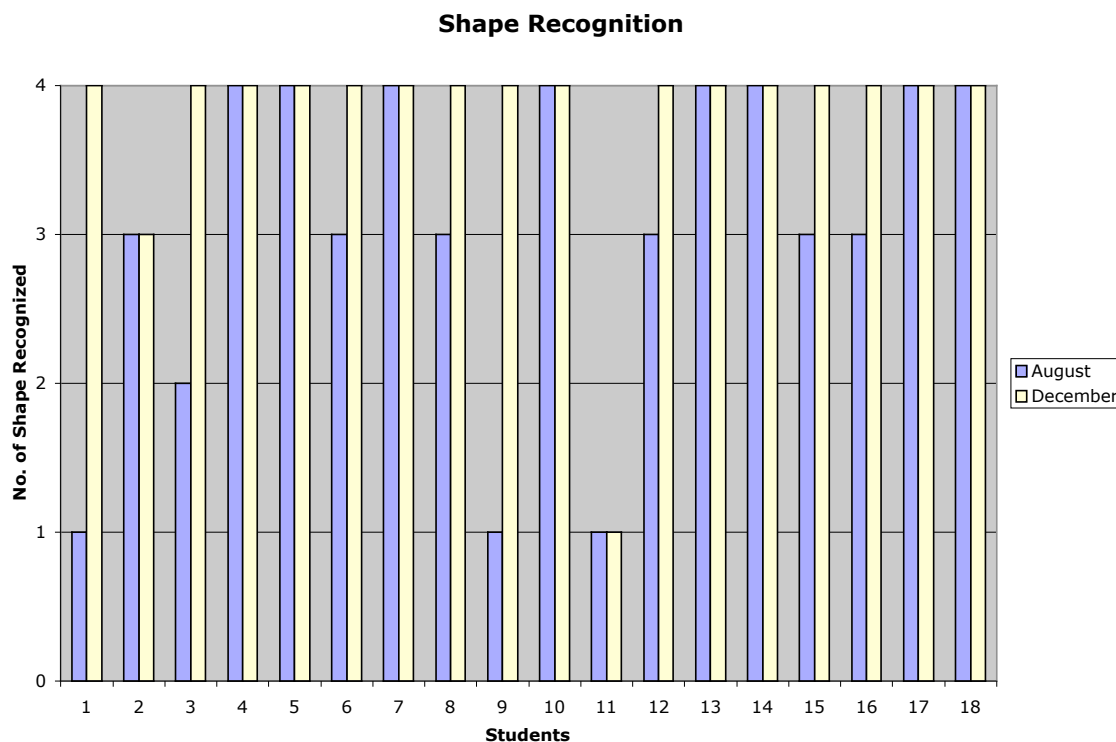


Kindergarten students were assessed in August and then again in December on Rote Counting 1-100. In August, all students were able to count to 10; 11 students counted to 25; one student counted to 50 and no students counted to 100. In December, all students counted to 25; five students counted to 50 and three students counted to 100.

#### *Student Data on Shape Recognition*

Data was collected from the kindergarten students who participated in music and movement activities in the classroom as shown below in Figure 4:

**Figure 4** Distribution of Student Responses for Shape Recognition

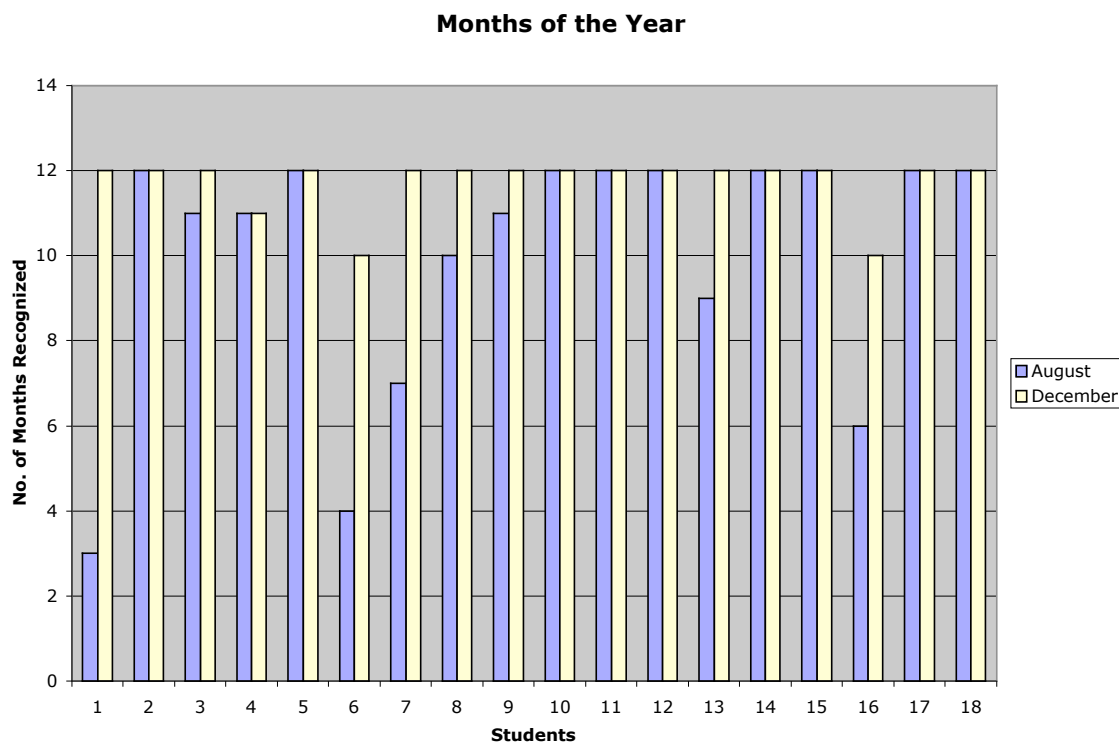


In August and again in December, kindergarten students were assessed in the area of shape recognition including the shapes circle, square, rectangle and triangle. In August, there were eight of 18 students that knew all four shapes. In December, there were 16 of 18 students who knew all four shapes.

*Section 6 Miscellaneous Checklists on Months of the Years, Days of the Week and Writing Numbers 1-10.*

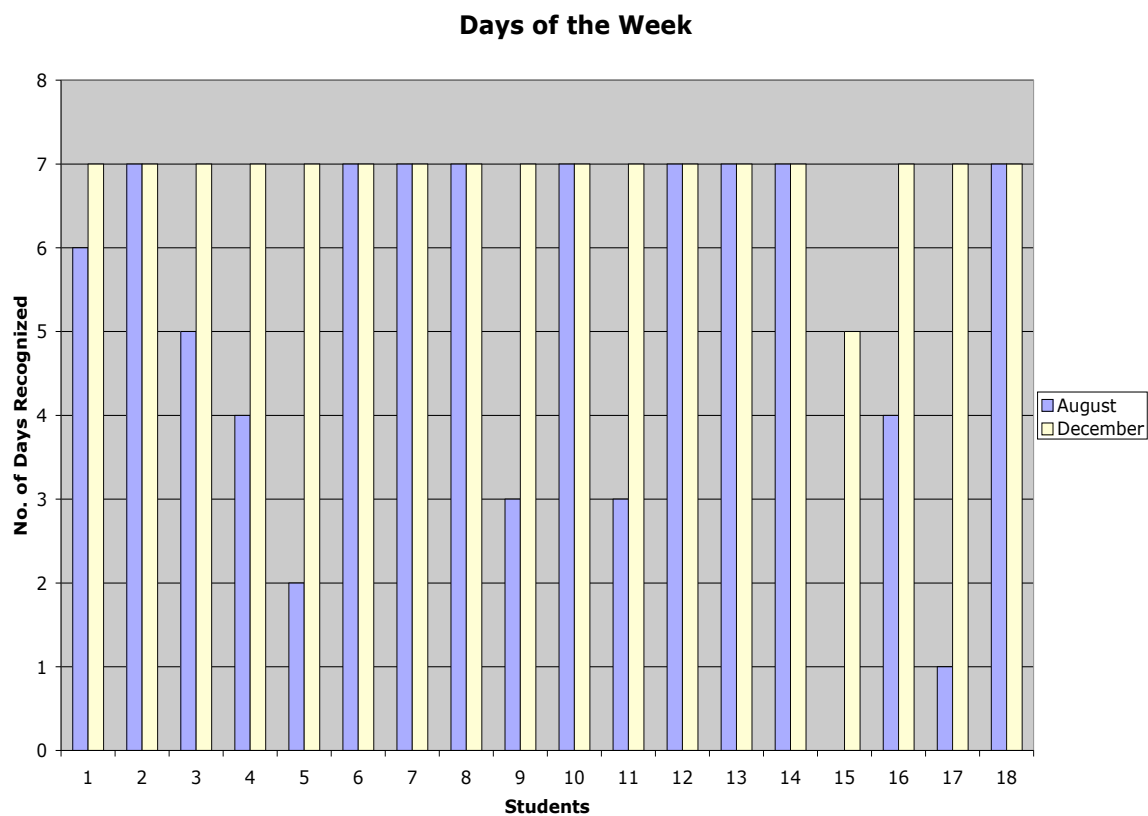
Data was collected from the kindergarten students who participated in music and movement activities in the classroom (see Figures 5, 6 and 7).

**Figure 5** Distribution of Student Responses for the Months of the Year



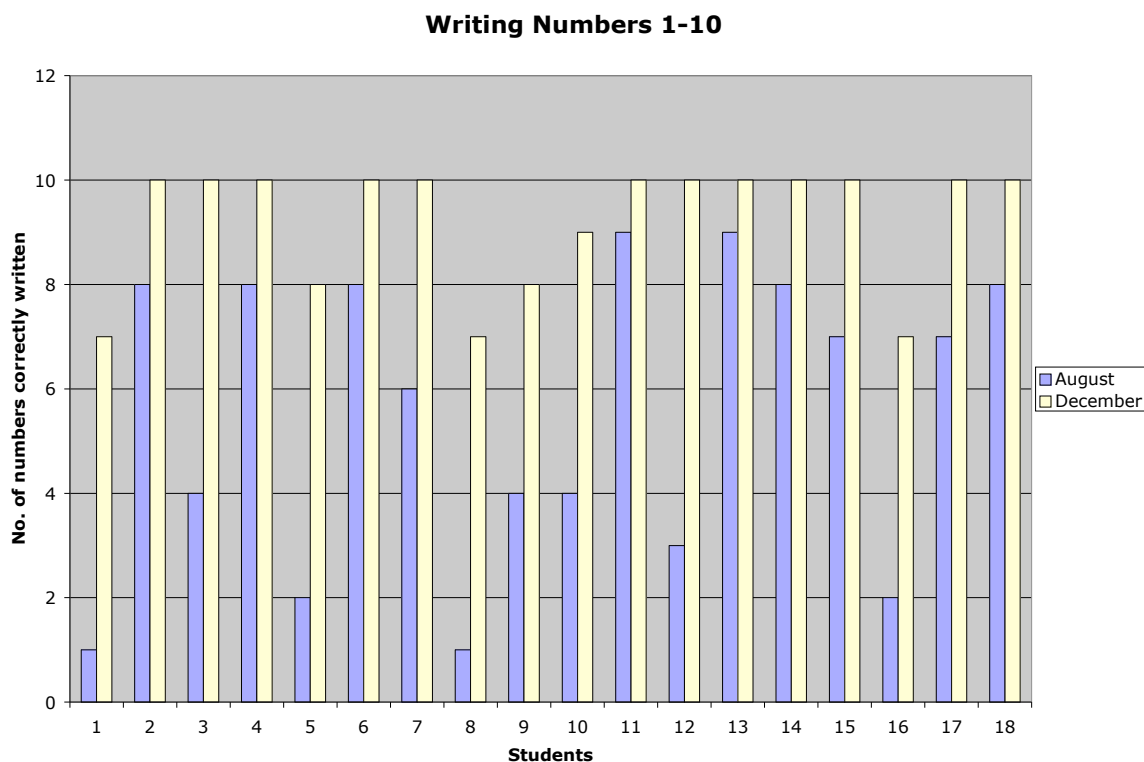
In August, students were assessed in the area of the knowledge of months of the year and then assessed again in December. In August, nine of 18 students knew all twelve months of the year. In December, 15 of 18 students knew all twelve months of the year.

**Figure 6** Distribution of Student Responses for the Days of the Week



In August and then again in December, kindergarten students were assessed in the area of knowing the Days of the Week. In August, nine of 18 students knew all seven days of the week. In August 17 of 18 students knew all seven days of the week.

**Figure 7** Distribution of Student Responses for Writing Numbers 1-10

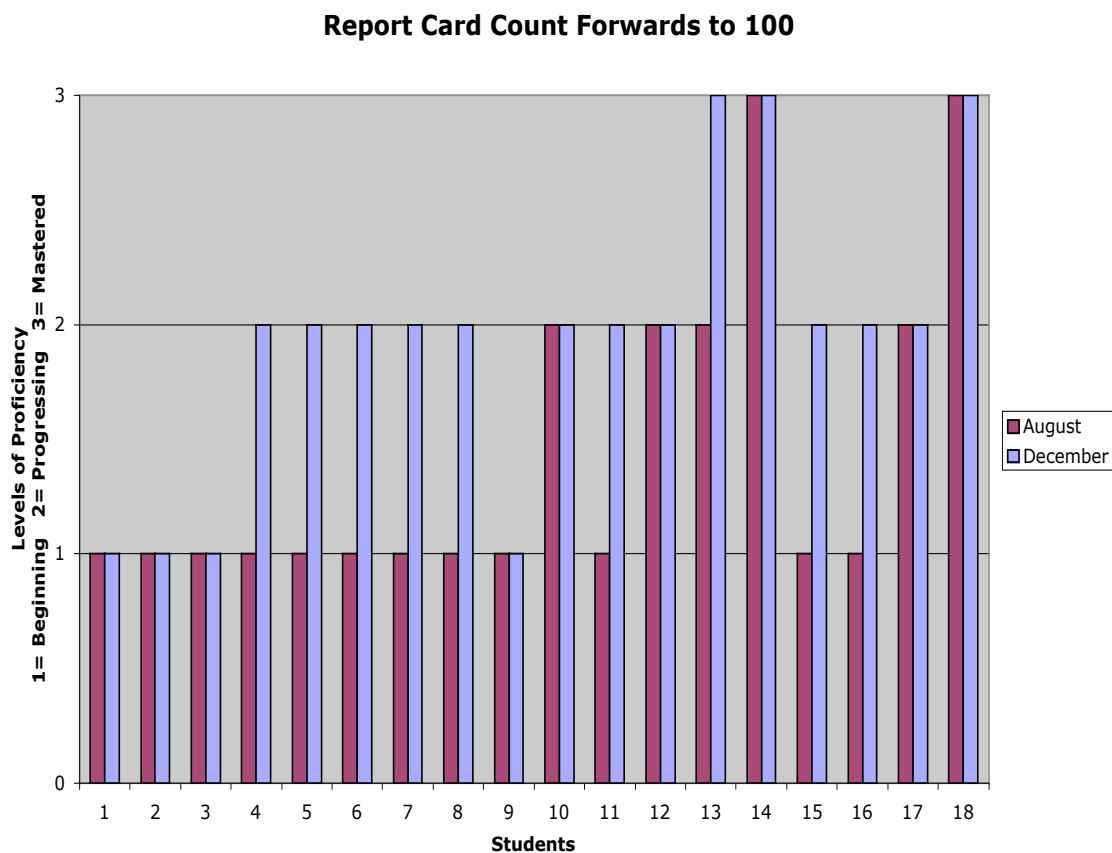


In August, and then again in December, kindergarten students were assessed in the area of writing numbers 1-10. In August, zero of 18 students were able to write all numbers 1-10. In December, 12 of 18 students could write numbers 1-10.

#### *Section 6 Quarterly Report Cards*

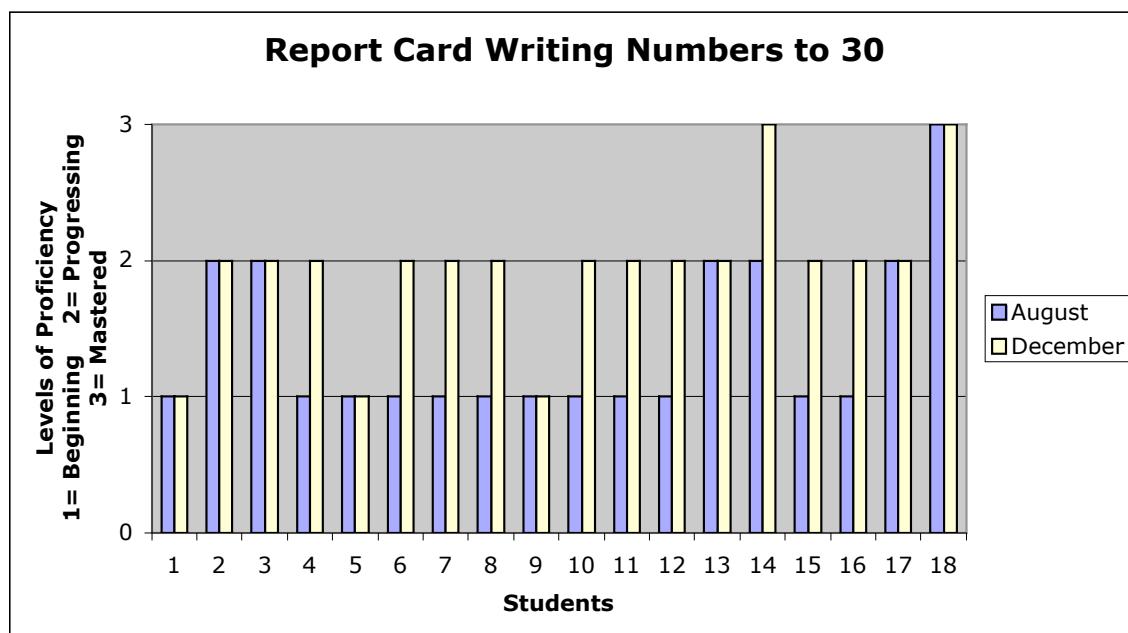
Data was collected from kindergarten students who participated in music and movement activities in the classroom for the first and second quarter of the school year (see Figures 8, 9, 10, 11).

**Figure 8** Distribution of Kindergarten Students Responses for Counting Forwards



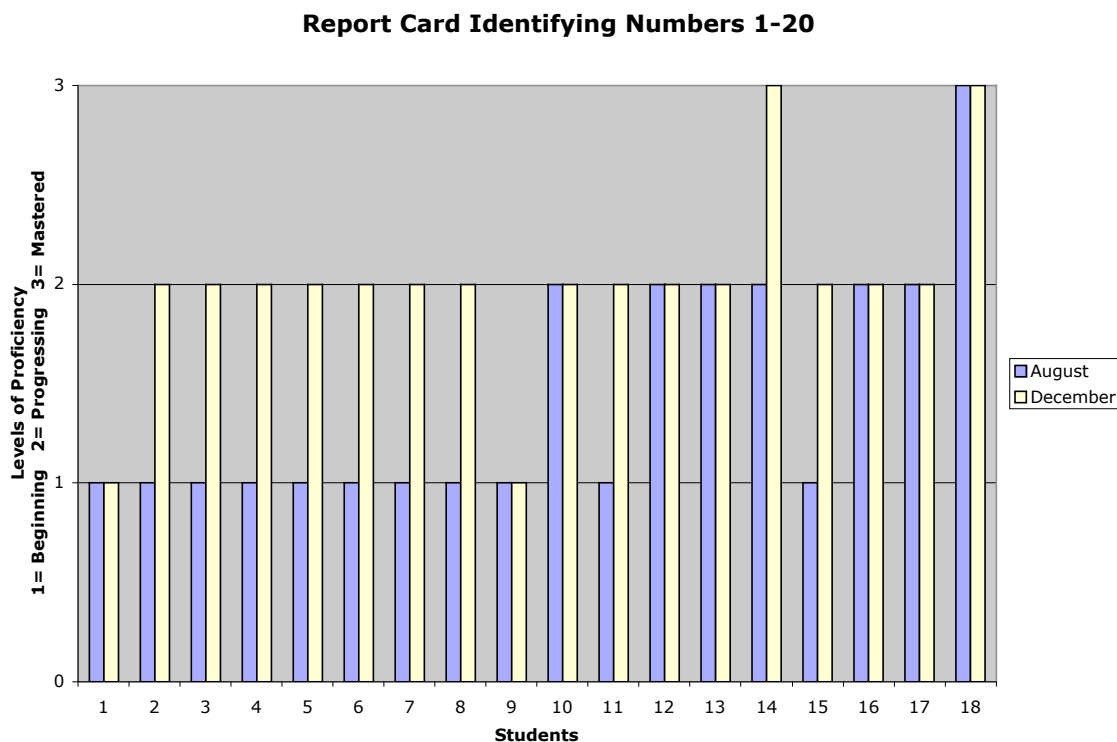
Kindergarten students were assessed in August and again in December and the data on counting to 100 was reported on the district wide report cards for the first quarter and second quarter of the school year. In August, the skill of counting to 100 was assessed and there were 12 students in the beginning stage, three in the progressive stage and three students who had mastered this skill. In December, there were four students in the beginning stage, 11 students progressing and two students who had mastered the skill.

**Figure 9** Distribution of Student Responses for Writing Numbers to 30



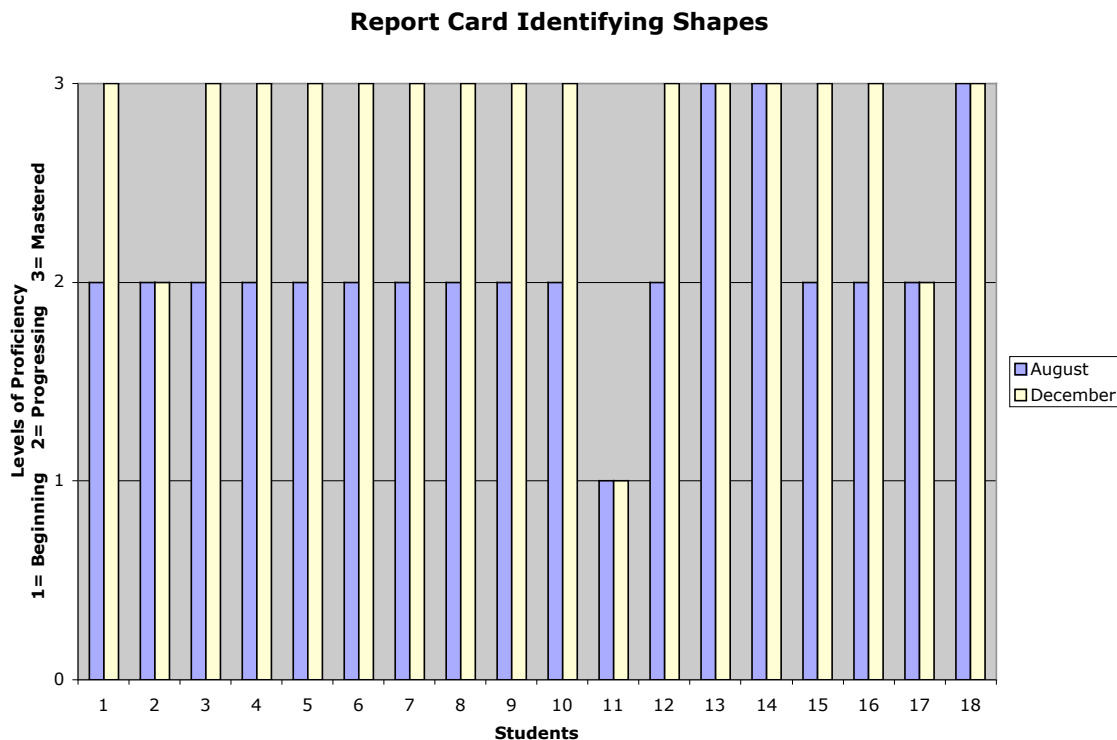
In August, there were 12 out of 18 in the beginning level and in December there were three of 18 students in the beginning level. In August there were five of 18 students in the progressing level and in December there was 13 of 18 students in the progressing.

**Figure 10** Distribution of Student Responses for Identifying Numbers 1-20



In August and then again in December, the skill of identifying number 1-20 was assessed and the results are as follows: 11 students were in the beginning, six students were progressive and one student had mastered the skill compared to two students in the beginning, 14 in the progressive and two who has mastered the skill in December.

**Figure 11** Distribution of Student Responses for Identifying Shapes



In August there was one student in the beginning level and in December this same student stayed in the beginning level. In August, there were 14 students in the progressing level and in December there were two students that stayed at the progressing level and the other 12 moved to the mastered level. In August there were three students that were in the mastered level and in December there were 15 students in the mastered level.

### Discussion

#### *Overview of Study*

The purpose of this study was to discover the effects of music and movement on kindergarten students when integrated into the math curriculum. The specific questions that the researcher attempted to answer included: Does music and movement have

positive effects on student's achievement in the kindergarten classroom? How did students feel when music was played and movement activities were done before formal math instruction? How did participation in music and movement activities affect attitude toward math achievement?

Multiple data was gathered, both qualitative and quantitative to establish the findings. Qualitative data was collected in the form of student surveys, oral questionnaires, anecdotal notes, and journal entries. Quantitative data was in the form of pre and post math assessments, miscellaneous checklists and quarterly report cards. The quantitative data provided the researcher the changes over time, while the varied qualitative data answered the "why" for further depth and accuracy.

#### *Summary of Findings*

Based on the data gathered, the researcher was able to answer all questions posed prior to the beginning of the study. Data suggested that music and movement activities affected kindergarten students in the area of math.

The primary question that the researcher wanted to answer was how does integrating music and movement into the math curriculum affect student achievement in a kindergarten classroom. Data indicated a significant increase in overall student achievement in all the areas of math that the researcher studied. The data collected on pre and post Saxon assessments are as follows: in the area of number recognition six students improved with 14 students able to recognize numbers 1-10 at the end of the study. For rote counting there was an increase of nine more students counting to 25, increase of four students counting to 50, and at the end of the study three students were

able to count all the way to 100. In the area of shape recognition there was an increase of 8 students who recognized all four shapes.

Miscellaneous checklists were used by the researcher for the following areas: for the skill of reciting the months of the year there was an increase of six students and an overall positive change for all students in their knowledge of the months. Reciting the Days of the Week, eight of 18 students improved in this area. The one student who was unable to say all seven days of the week improved from knowing zero of seven days in August to 5 of 7 days in December. For the skill of writing numbers to 30, 8 of 18 students made significant progress. In August there was one student who was in the mastery level and then in December there were two students. Overall the data shows significant gains in all skills.

Using quarterly report cards, the researcher noted significant increases in students moving from beginning level to the progressive level and on to the mastery level. Report cards provided information on the following skills: comparing results for the skill of counting to 100, the researcher noted an increase in students moving from the beginning level to the progressive level. For writing numbers to 30, the data indicated that eight students made progress in this area. For the skill of identifying numbers to 20, there were 13 of 18 students ending up in the progressing level, indicating an increase of eight students from August to December. There was significant progress made in the knowledge of shape recognition, whereby 17 of 18 students could identify all four shapes in December compared to three of 18 students in August, indicating an increase of 14 students.

A second question the researcher addressed was how students felt when music and movement activities were done before formal math instruction and throughout the day. The main trend that emerged from the student pre and post surveys was that the majority of the students enjoy music at home, school and the classroom. Overall, the students had positive feedback towards music and movement in both August and December. Oral Questionnaires randomly given and anecdotal notes used throughout the study showed a common pattern of the student's enjoyment of music and movement in the classroom. The other apparent pattern was that the students who were reluctant to participate at the beginning of the study became more active participants at the end of the study.

The final question the researcher addressed in the study dealt with how participation in music and movement activities affected attitude toward achievement. According to the student survey given, the majority of the students felt that listening to music was advantageous to helping them learn. This theme prevailed throughout the researcher's journal entries, for the duration of the study, with many students using songs to help them remember the different math skills they needed to know in kindergarten. The majority of students appeared engaged in their math activities when songs were played during and after formal instruction, during calendar time and randomly throughout the day

### *Conclusions*

The researcher gathered and analyzed all data, and came to the conclusion that when music and movement were integrated into the math curriculum there were positive affects on achievement in kindergarten students. Using music in the classroom offers

many great opportunities for children. When music is played, research shows the brain is more stimulated and increases the amount of information that is retained and recalled. Music provides students with strategies to increase one's memory and strategies to improve math skills. Movement also plays an important role in student's learning, as it influences the brain in a positive way and keeps students actively engaged. Research indicates that using physical activity in the classroom keeps students alert and ready to learn.

It was overwhelmingly clear that the research proved that music and movement is beneficial to a student's learning in all areas, specifically math. "Some of today's leading learning techniques embraces the use of music to assist in learning. Nearly all methods can be enhanced through the use of music"(Brewer, 1995 p.6).

### *Recommendations*

The results from this study illustrated that kindergarten students benefited from having music and movement integrated into the math instruction. Kindergarten student's attitudes were positive with the use of movement and music in the classroom as well as feeling more successful. When music and movement activities were implemented before, during, and after formal math instruction time, during calendar activities and throughout the day, students were engaged and focused on learning.

As a result of these findings, the researcher will continue to use music and movement activities not only in the area of math but all subject areas in the kindergarten classroom. The impact that music and movement had on the kindergartens students was shown through their gains in math achievement with the various skills assessed by the researcher. Positive attitudes were displayed and an increase in participation noted. The

researcher believes that music plays an integral part in the early childhood classroom, as well as all other classrooms and should be a significant part of any math curriculum in order to move students of all ages towards academic achievement.

The researcher recommends that if this study were to be replicated, that the future researcher might want to look at student achievement in all areas, and not just in the area of math. Music and movement can play a significant part in others areas such as phonemic awareness, alphabet and sound recognition.

#### *Limitations of the Study*

Limitations that could have affected this study were individual teaching styles and personalities of teachers and students within the context of the research. Survey questions might not have been clear to all the kindergarten students or their responses could have been tainted with the need to please the researcher instead of answering the questions honestly. The different types of music played in the classroom or the particular type of movement activities could have affected a student's participation level, whereby students could have just not liked a particular song or the activity that was done with it.

The future implication is that music and movement will increase the learning process, build and maintain a positive learning environment so all students can reach their academic potential.

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## Appendix A

## Permission Forms

\_\_\_\_\_ Kindergarten Classroom has been invited to participate in a study of **Researching Music and Movement in Math**. \_\_\_\_\_ hopes to learn that when music and movement are integrated in math, students will be actively engaged and student achievement will be improved.

Students will be asked to do the following:

- \* participate in a variety of activities with music and movement in math
- \*be part of observations
- \*be part of math assessments
- \*turn in samples of their work

The students will hopefully benefit by:

- \*being actively engaged in math
- \*increasing math scores
- \*increasing knowledge in math concepts
- \*making learning math concepts fun and meaningful

Any information that is obtained in connection with this study and that can be identified with students will remain confidential and will be disclosed only with parental permission.

Your decision whether or not to allow students to participate will not prejudice future relations with Wayne State College, \_\_\_\_\_ Public School or \_\_\_\_\_. If you decide to allow students to participate, they are free to discontinue participation at any time without prejudice.

If you have any questions, please ask \_\_\_\_\_. She may be reached at school by phone: \_\_\_\_\_, or by e-mail at \_\_\_\_\_. If questions arise later, \_\_\_\_\_ will be happy to answer them.

Your signature below indicates that you have read and understand the information provided above, and have decided to allow students to participate. The students may withdraw at any time without prejudice should they choose to discontinue participation in this study.

\_\_\_\_\_  
Signature of School Principal.

Date \_\_\_\_\_

## Appendix A (continued)

\_\_\_\_\_ kindergarten Classroom has been invited to participate in a study of **Researching Music and Movement in Math**. \_\_\_\_\_ hopes to learn that when music and movement are integrated in math, student's will be actively engaged and student achievement will be improved.

Students will be asked to do the following:

- \* participate in a variety of activities with music and math
- \*be part of observations
- \*be part of math assessments
- \*turn in samples of their work

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- \*being actively engaged in math
- \*increasing math scores
- \*increasing knowledge in math concepts
- \*making learning math concepts fun and meaningful

Any information that is obtained in connection with this study and that can be identified with students will remain confidential and will be disclosed only with parental permission.

Your decision whether or not to allow students to participate will not prejudice future relations with Wayne State College, \_\_\_\_\_ Public School or \_\_\_\_\_. If you decide to allow students to participate, they are free to discontinue participation at any time without prejudice.

If you have any questions, please ask \_\_\_\_\_. She may be reached at school by phone: \_\_\_\_\_, or by e-mail at \_\_\_\_\_. If questions arise later, \_\_\_\_\_ will be happy to answer them.

Your signature below indicates that you have read and understand the information provided above, and have decided to allow students to participate. The students may withdraw at any time without prejudice should they choose to discontinue participation in this study.

\_\_\_\_\_  
Signature of School Superintendent

Date \_\_\_\_\_

## Appendix A (continued)

Your child was selected as a possible participant because he/she is a student in \_\_\_\_\_ kindergarten classroom. \_\_\_\_\_ hopes to learn that when music and movement are integrated in math, student's will be actively engaged and student achievement will be improved

Students will be asked to do the following:

- \* participate in a variety of activities with music and math
- \* be part of observations
- \* be part of math assessments
- \* turn in samples of their work

Your child will hopefully benefit by:

- \* being actively engaged in math
- \* increasing math scores
- \* increasing knowledge in math concepts
- \* making learning math concepts fun and meaningful

Any information that is obtained in connection with this study and that can be identified with students will remain confidential and will be disclosed only with parental permission.

Your decision whether or not to allow your child to participate will not prejudice future relations with Wayne State College, \_\_\_\_\_ Public School or \_\_\_\_\_. If you decide to allow students to participate, they are free to discontinue participation at any time without prejudice.

If you have any questions, please ask \_\_\_\_\_. She may be reached at school by phone: \_\_\_\_\_, or by e-mail at \_\_\_\_\_. If questions arise later, \_\_\_\_\_ will be happy to answer them.

Your signature, and that of your child's below indicates that you have read and understand the information provided above, have discussed this information with your child, and have decided to allow your child to participate. Your child may withdraw at any time without prejudice after signing this form should you choose to have him/her discontinue participation in this study.

\_\_\_\_\_  
Signature of Parent or Legal Guardian

Date \_\_\_\_\_

\_\_\_\_\_  
Signature of Child

Date \_\_\_\_\_

\_\_\_\_ No, I do not wish to have my child participate in this study: \_\_\_\_\_  
Signature of Parent or Legal Guardian

## Appendix A (continued)

\_\_\_\_\_, a student in \_\_\_\_\_ kindergarten classroom, has been invited to participate in a study of **Integrating Music and Movement in Math**. \_\_\_\_\_ hopes to learn that when music and movement are integrated in math, students will be actively engaged and student achievement will be improved. This student was selected as a possible participant because he/she is a student in \_\_\_\_\_ kindergarten classroom.

Students will be asked to do the following:

- \* participate in a variety of activities with music and math
- \*be part of observations
- \*be part of math assessments
- \*turn in samples of their work

The child will hopefully benefit by:

- \*actively engaged in math
- \*increasing math scores
- \*increasing knowledge in math concepts
- \*making academic concept fun and meaningful

Any information that is obtained in connection with this study and that can be identified with students will remain confidential and will be disclosed only with parental permission.

Your decision whether or not to allow students to participate will not prejudice future relations with Wayne State College, \_\_\_\_\_ Public School or \_\_\_\_\_. If you decide to allow students to participate, they are free to discontinue participation at any time without prejudice.

If you have any questions, please ask \_\_\_\_\_. She may be reached at school by phone: \_\_\_\_\_, or by e-mail at \_\_\_\_\_. If questions arise later, \_\_\_\_\_ will be happy to answer them.

Your signature below indicates that you have read and understand the information provided above, and have decided to allow this child to participate. The child may withdraw at any time without prejudice after signing this form should he/she choose to discontinue participation in this study.

\_\_\_\_\_  
Signature of IEP Case Manager

Date \_\_\_\_\_

\_\_\_\_ No, I do not wish to have this child participate in this study: \_\_\_\_\_  
Signature of IEP Case Manager

## Appendix B

## Student Survey

Student Name \_\_\_\_\_

Date \_\_\_\_\_

Do you like to sing?	Yes	No
Do you sing at home?	Yes	No
Do you like to dance?	Yes	No
Do you think you learn from songs we sing at school?	Yes	No
Do you like to sing in class?	Yes	No
Do you like to move when you sing?	Yes	No
Does music make you feel good?	Yes	No
Do you work well when music is played in the background?	Yes	No
Do you feel good when you get up and move about?	Yes	No

## Appendix C

## Pre/Post Saxon Math Assessment

Name \_\_\_\_\_  
Teacher \_\_\_\_\_Pretest \_\_\_\_\_  
Posttest \_\_\_\_\_

<b>SAXON K-2 MATH TEST (Part A)</b>					
Question Number	Question / Problem	Correct Answer	Correct	Not Correct	Notes
<b>SHAPES</b>					
1	What is this shape?	square			
2	What is this shape?	triangle			
3	What is this shape?	circle			
4	What is this shape?	rectangle			
<b>COUNTING</b>					
5	Count as high as you can.	1 - 100			Last Number: _____
6	Make another row of pennies that matches (is the same) as my row of pennies.	8 pennies			
7	Count the pennies in your row.	8 pennies			
8	What number is on this number card?	7			
9	Show me that number of pennies.	7 pennies			
10	What number is on this number card?	9			
11	Show me that number of pennies.	9 pennies			
12	What number is on this number card?	3			
13	Show me that number of pennies.	3 pennies			
14	What number is on this number card?	0			
15	Show me that number of pennies.	0 pennies			
16	Put these number cards in order.	0 - 9			
<b>COINS / SORTING / COMPARING</b>					
17	What do we call this?	penny			
18	What do we call this?	nickel			
19	What do we call this?	dime			

Appendix D  
Checklists

## Number Recognition—Written

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1									
		13							
	22								

## Appendix D (continued)

## Checklists

**Number Recognition**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

2	9	4	3	1
15	5	10	16	7
17	13	11	18	8
19	22	30	6	24
21	27	12	25	20
26	28	14	29	23

## Appendix D (continued)

## Checklists

Name \_\_\_\_\_

Months of the Year

	August	December
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
End Result		

## Appendix D (continued)

## Checklists

Name \_\_\_\_\_

**Days of the Week**

	August	December
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
<b>End Result</b>		

## Appendix E

Sample of a Report Card  
(Beginning-B, Progressive-P, Mastered-M)

## EL.00.MA – Kindergarten Mathematics

## EL.00.MA.1 – Number and number sense

EL.00.MA.1.1 – Recognizes ordinal numbers B

EL.00.MA.1.2 – Recognizes relative positions P M

EL.00.MA.1.3 – Counts forward to 100 P

EL.00.MA.1.4 – Counts backward from 10 P

EL.00.MA.1.5 – Identifies numerals to 30 P

EL.00.MA.1.6 – Writes numerals to 30 P

EL.00.MA.1.7 – Counts sets of objects to 30 P

EL.00.MA.1.8 – Compares groups using the terms more, fewer,  
and the same P

EL.00.MA.1.9 – Counts by 5's and 10's to 100 B

## EL.00.MA.2 – Patterns, Function and Algebra

EL.00.MA.2.1 – Sorts and classifies objects P M

EL.00.MA.2.2 – Interprets and uses graphs P

EL.00.MA.2.3 – Identifies, describes and extends patterns  
involving shape, size or color P M

## EL.00.MA.3 – Geometry and Measurement

EL.00.MA.3.1 – Identifies &amp; describes shapes P

EL.00.MA.3.2 – Tells time to the hour P

EL.00.MA.3.3 – Identifies penny, nickel and dime P

EL.00.MA.3.4 – Tells the value of penny, nickel and dime  
P

## EL.00.MA.4 – Computation and Estimation

EL.00.MA.4.1 – Adds and subtracts numbers using up to ten  
objects

## EL.00.MA.5 – Level at which your child is working in

## Mathematics

EL.00.MA.5.1 – Independently X X

EL.00.MA.5.2 – With some teacher support

EL.00.MA.5.3 – With much teacher support

## Appendix F

## Song /Resource List

*Recognize # 1-10*

1. Dr. Jean's Totally Math
  - #2 Number March
  - #4 I Know an Old Lady (numbers)
  
2. Jack Hartman Math
  - #2 Clapping Machine
  - #11 What Number Comes Next?
  - #13 Number All Around
  
3. Greg and Steve (Vol.2)
  - #7 Number Game (#1-5)
  
4. 50 Fun Songs for Children
  - #29 Five Green Bottles
  
5. Number Counting
  - #1 Six Little Ducks
  - #2 One, Two Buckle My Shoe
  - #3 Five Little Monkeys
  - #4 This Old Man
  - #5 One Elephant Went Out To Play

*Writing Numbers 1-10*

1. Dr. Jean's Totally Math
  - #5 Chant and Write
  - #6 Sing and Spell
  
2. Jack Hartman Math
  - #10 Number Writing Rhyme
  
3. Dr. Jean's Kiss Your Brain
  - #13 Spelling Numbers
  
4. Dr. Jean's Sing to Learn
  - #9 Numeral Song

## Appendix F (continue)

## Song /Resource List

*Counting Forwards to 20*

1. Dr. Jean's Just For Fun  
#6 Zero the Hero Number Stomp  
#15 Five Little Hot Dogs
2. Dr. Jean's Totally Math  
#18 Country Countdown 1-20  
#20 Techno Count to 100  
#21 Skip Counting
3. Greg & Steve We All Live Together Vol. 2  
#2 The Number Rock
4. CD #2 The Bear Went Over the Mountain  
#15 Six Little Ducks
5. CD #3 Hey Diddle Diddle  
# 6 Ants Go Marching
6. Jack Hartman Math  
#20 Counting  
#27 Let's Do The Number Rumba  
#5 Count 1 to 20
7. 50 Silly Songs for Kids  
#26 One Bottle of Pop
8. Dr. Jean's Sings Silly Songs  
#19 Five Fish Swimming in the Sea
9. Dr. Jean's Totally Math  
#3 Five Little Crabs  
#7 Five Little Monkeys
10. Jack Hartman Math  
#19 Ten Little Donkeys
11. CD#1 Shoo Fly  
#18 Roll Over (6 in a bed)
12. CD# 4 Agoong Went The Little Green Frog

## Appendix F (continued)

## Song List

*Days of the Week*

1. Dr. Jean & Friends  
# 1 Today is Sunday  
#12 Days of the Week
2. Dr. Jean's Totally Math  
#11 Days of the Week
3. Jack Hartman Math  
#1 Start the Day
4. Dr. Jean's Keep on Singing and Dancing  
#12 The First 12 Days of School

*Months of the Year*

1. Dr. Jean & Friends  
#13 Macarena Months
2. Dr. Jean's Totally Math  
#12 Months of the Year
3. Greg & Steve We All Live Together Vol. 2  
#3 Months of the Year
4. Dr. Jean's All Day Long  
#3 Month Hop

*Resource List*

50 Silly Songs for Kids (2003)

CD # 1, Shoo Fly (2005)

CD # 2 The Bear Went Over the Mountain (2005)

CD # 3, Hey Diddle Diddle (2005)

CD # 4 Agoong Went the Little Green Frog (2005)

Dr. Jean, All Day Long (2004)

Dr. Jean, Dr. Jean and Friends (1998)

Dr. Jean, Just for Fun (2005)

Dr. Jean, Keep on Singing and Dancing (1999)

Dr. Jean, Kiss Your Brain (2003)

Dr. Jean, Sings Silly Songs (1997)

Dr. Jean, Sing to Learn (2000)

Dr. Jean, Totally Math (2006)

Greg and Steve, Music and Movement in the Classroom, (2000)

Greg and Steve, We All Live Together Vol. 2 (1983)

Jack Hartman Math (1998)

## Appendix G

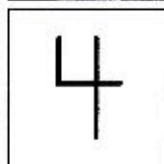
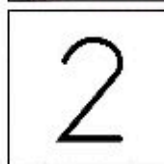
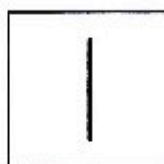
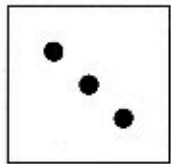
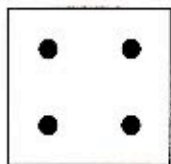
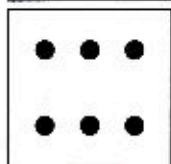
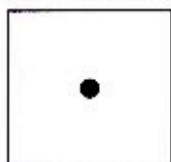
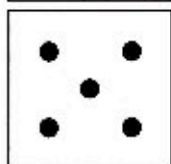
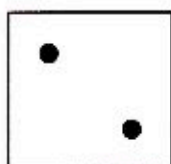
## Samples of Saxon Math Worksheets

## Lesson Practice 62

Saxon Math K (for use with Lesson 62)

Name \_\_\_\_\_

Draw lines to match the dot squares to the number cards.



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Color the square with the most dots red.

Color the square with the fewest dots green.

## Appendix G (continued)

## Sample of Saxon Math Worksheets

**Lesson Practice 37**

Saxon Math K (for use with Lesson 37)

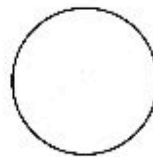
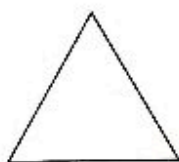
Name \_\_\_\_\_

Color the first shape green.

Color the second shape purple.

Color the third shape brown.

Color the fourth shape orange.



Point to the shape that is third.

What do we call this shape?

Point to the shape that is first.

What do we call this shape?

Point to the shape that is second.

What do we call this shape?

Point to the shape that is fourth.

What do we call this shape?

## Appendix H

## Math/Music/Movement Activities

# Dinosaurs Dancing

Words by Lullia Connolly. Music by Suzen Tragh  
Copyright 1991, Kluwer (ASCAP)

Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 1.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing in the noontday sun.  
La, la, la, la 1.  
Dinosaurs dancing in the noontday sun.

Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 2.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing in the morning dew.  
La, la, la, la 1.  
La, la, la, la 2.  
Dinosaurs dancing in the morning dew.

Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 3.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing for you and me.  
La, la, la, la 1.  
La, la, la, la 2.  
La, la, la, la 3.  
Dinosaurs dancing for you and me.

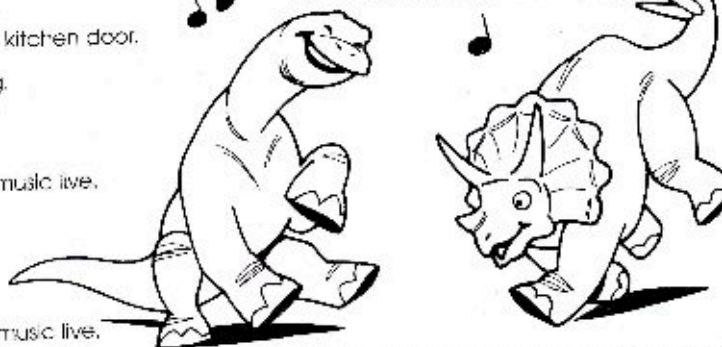
Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 4.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing out the kitchen door.  
La, la, la, la 1.  
La, la, la, la 2.  
La, la, la, la 3.  
La, la, la, la 4.  
Dinosaurs dancing out the kitchen door.

Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 5.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing to the music live.  
La, la, la, la 1.  
La, la, la, la 2.  
La, la, la, la 3.  
La, la, la, la 4.  
La, la, la, la 5.  
Dinosaurs dancing to the music live.

Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 6.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing and doing tricks.  
La, la, la, la 1.  
La, la, la, la 2.  
La, la, la, la 3.  
La, la, la, la 4.  
La, la, la, la 5.  
La, la, la, la 6.  
Dinosaurs dancing and doing tricks.

Di-dino-dinosaurs dancing.  
Dinosaurs dancing I see 7.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing up to heaven.  
La, la, la, la 1.  
La, la, la, la 2.  
La, la, la, la 3.  
La, la, la, la 4.  
La, la, la, la 5.  
La, la, la, la 6.  
La, la, la, la 7.  
Dinosaurs dancing up to heaven.

Di-dino-dinosaurs dancing.  
Dinosaurs dancing.  
Don't make a peep.  
Dinosaurs dance.  
Dance, dance, dancing.  
Dinosaurs dancing while I sleep.  
La, la, la, la, la.  
Dinosaurs dancing while I sleep.



Appendix H (continued)  
Math/Music/Movement Activities

LESSON

6



Objectives

- ♫ To improve counting skills and number concepts
- ♫ To strengthen singing skills
- ♫ To develop movement skills to coordinate with music

Skills



- ♫ Counting
- ♫ Creativity
- ♫ Singing

Music



CD #1, Track 6:  
"Dinosaurs Dancing"

# Dinosaurs Dancing

ACTIVITY

- 1 In advance, create movements for the song "Dinosaurs Dancing." Before you introduce movements to the class, practice them until you are proficient.
- 2 Have children face you and stand at least one arm's length away from each other in all directions.
- 3 Play "Dinosaurs Dancing," and lead children in performing the movements in time with the music. Repeat as desired. Encourage children to sing along with the music while they do the movements.
- 4 Have several children lead the class in moving and singing with the music. Ask for new volunteers to repeat the activity.

EXTENSIONS


- Have children draw pictures that illustrate the song lyrics.
- Have the class create lines for 8, 9, and 10. Have children create movements and illustrations for the new lyrics.
- Include this lesson in a larger unit on the study of dinosaurs.

## Appendix H (continued)

## Math/Music/Movement Activities


LESSON

17



Objective

♪ To sing the days of the week




Skills

♪ Singing

♪ Movement

♪ Reading



Music

CD #2, Tracks 3 and 4: "Days of the Week #1" and "Days of the Week #2"

# Days of the Week

ACTIVITY

- 1 Recite each line of the song "Days of the Week #1," and have the class echo in response after each line. Put up one finger for each day you recite. Have children do the same in response.
- 2 Have children practice singing the song with the music.
- 3 Allow children to make up movements to dramatize the second verse of the song.

EXTENSIONS

- Teach the class the days of the week in Spanish: lunes, martes, miércoles, jueves, viernes, sábado, domingo. Play the Spanish version of the song, "Days of the Week #2," and have the class sing along.
- Give each child a copy of the Munchie Monster reproducible (page 63). Read aloud the words, and discuss the pictures. Have children color and cut out the food pieces and then glue each one above the corresponding day of the week.




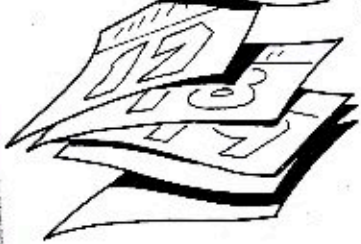
98 Math & Movement in the Classroom For K-2 © 2002 Creative Teaching Press

## Appendix H (continued)

## Math/Music/Movement Activities

# Days of the Week

Words and Music by Christopher and Cynthia Moroney  
Copyright 1980, Little House Music (ASCAP)

## Days of the Week #1





Monday, Tuesday,  
Wednesday, Thursday, Friday,  
Saturday, and Sunday.  
The days of the week.

(Repeat)

Start each day with a smile.  
Make each day full of fun.  
So let's make each and every day  
A very, very special one.

(Repeat)

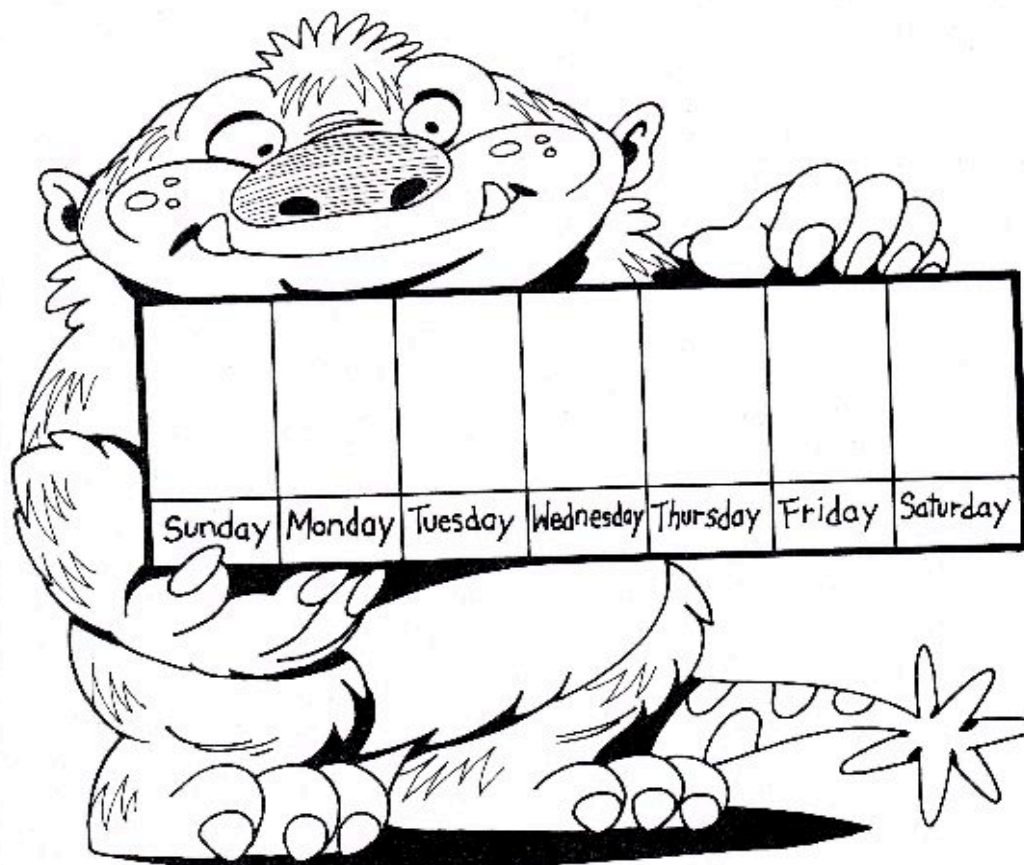
The days of the week!

Math & Movement in the Classroom Packet © 2001 Creative Teaching Press 259

Appendix H (continued)  
Math/Music/Movement Activities

## Munchie Monster



Monday—sandwich    Tuesday—ice    Wednesday—Popcorn    Thursday—fries    Friday—chocolate bar    Saturday—ice    Sunday—Ooh! A stomachache

## Appendix H (continued)

## Math/Music/Movement Activities

## LESSON

## 9



## Objectives

- ♫ To recognize shapes (circle, square, oval, star, triangle, rectangle)
- ♫ To listen and follow directions in music
- ♫ To practice teamwork

## Skills



- ♫ Identifying Shapes
- ♫ Listening
- ♫ Teamwork
- ♫ Movement

## Music



CD #1, Tracks 9 and 10: "Shaping up with Shapes #1" and "Shaping up with Shapes #2"

# Shaping up with Shapes

## ACTIVITY

- 1 In advance, display one example of each shape mentioned in the objectives in different places around the room. The shapes should be within the children's reach. Also, prepare a poster or bulletin board display of all six shapes for referral.
- 2 Show the class examples of circles from the display. Have them find more examples of circles in the classroom. Ask them to name other places where they might see circles. Follow the same procedure with the remaining shapes.
- 3 Stand close to the display. Play the song "Shaping up with Shapes #1." Point to each shape as it is mentioned, and then lead the class in performing the movements described in the song.
- 4 Have six volunteers lead each of the six shape movements with "Shaping up with Shapes #1." Repeat with different leaders.

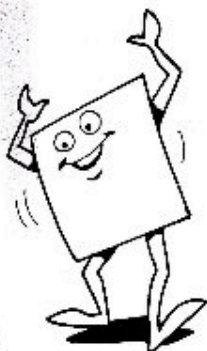
## EXTENSIONS

- Select children to choose shapes in a random order during "Shaping up with Shapes #2" (an instrumental version of the song). Have the class say the name of each shape and then do the corresponding movement learned from "Shaping up with Shapes #1." Remind children to freeze when the music stops each time.
- Have the class play the game "Shape Races." Say a child's name, and name a shape. Time (with a stopwatch, if available) how many seconds it takes the child to reach an object of the shape named. Repeat the activity with different volunteers and shapes. Then, challenge children to reach and correctly name all six shapes.

Appendix H (continued)  
Math/Music/Movement Activities

## Shaping up with Shapes

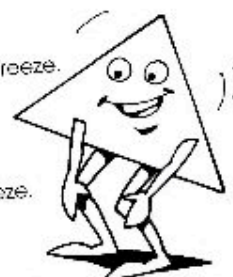
Words and Music by Steven Traugh  
Copyright 1991, Klavonator (ASCAP)



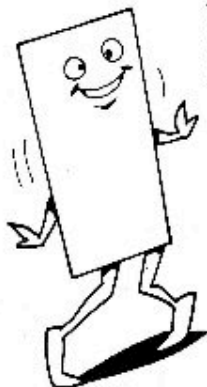
Spoken:  
Here's a fun game called "Shaping up with Shapes." Everyone should be standing where they have some room to safely move about. We'll call out a shape and then I'll describe a movement to do for that shape. Continue doing the movement until you hear me say "freeze." Then, you should freeze in place until we call the next shape and movement. Listen carefully and have fun!

When you see a square,  
Tap the top of your hair.  
Tap, tap, tap, tap, tap your hair when you see a square.  
Tap, tap, tap, tap, tap your hair when you see a square--freeze.

If a triangle you should see,  
Then tap on both your knees.  
Tap, tap, tap your knees if a triangle you should see.  
Tap, tap, tap your knees if a triangle you should see--freeze.



When you see a rectangle,  
Then wiggle with a jingle, jangle.  
Wiggle, wiggle with a jingle, jangle when you see a rectangle.  
Wiggle, wiggle with a jingle, jangle when you see a rectangle--freeze.



If an oval should appear,  
Then gently pull your ears.  
Pull, pull, pull, pull, pull your ears if an oval appears.  
Pull, pull, pull, pull, pull your ears if an oval appears--freeze.

When you see a star,  
Then lift weights with a bar.  
Lift, lift, lift, lift, lift with a bar when you see a star.  
Lift, lift, lift, lift, lift with a bar when you see a star--freeze.



If a circle you should spy,  
Wave your arms and say, "Good-bye."  
Wave, wave, wave, wave, say, "Good-bye" if a circle you spy.  
Wave, wave, wave, wave, say, "Good-bye" if a circle you spy--freeze.  
One more time, let's say, "Goodbye!"



