2004

Integrating technology to facilitate math instruction in the elementary classroom

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Abstract

Integrating technology throughout the elementary curriculum is a topic that concerns educators. This paper informs educators as to why they should explore the implementation of technology into the math curriculum in the elementary classroom. This paper discusses brain-based learning, how to use brain-based learning techniques as well as the computer to integrate math and the benefits of using the computer in the math classroom throughout the day in the elementary classroom.

Integrating Technology
To Facilitate Math Instruction
In The Elementary Classroom

A Graduate Review

Submitted to the

Division of Educational Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

UNIVESITY OF NORTHERN IOWA

By

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May 2004

This Review by: Terri Schmidt

Titled: Integrating Technology To Facilitate Math Instruction In The Elementary Classroom

has been approved as meeting the research requirement for the Degree of Master of Arts.

6-15-04
Date Approved

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6/17/04
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ABSTRACT

Integrating technology throughout the elementary curriculum is a topic that concerns educators. This paper informs educators as to why they should explore the implementation of technology into the math curriculum in the elementary classroom. This paper discusses brain-based learning, how to use brain-based learning techniques as well as the computer to integrate math and the benefits of using the computer in the math classroom throughout the day in the elementary classroom.

INTRODUCTION

Integrating technology seems to be a topic about which a growing number of educators are concerned. The purpose of this paper is to inform educators why they should explore the implementation of technology into the math curriculum in the elementary classroom. This author chose the area of math because the author's district adopted a new math curriculum. The Marion Independent School District is writing benchmarks and infusing technology into the curriculum. Educators need to think about the learning environment to facilitate the instruction process. After the learning environment is created the instructor needs to be aware of how students acquire knowledge and skills. When an educator is designing instruction, he or she needs to be aware of how to use technology to support the lessons. Many sources provide a number of methods to help the educator facilitate using computers in the classroom. In this paper, the term "computer-aided instruction" will refer to using the computer for individual instruction, as a tool for teachers to use in lesson design and as an assessment tool. The following questions pertaining to the associations between these issues were instrumental in prompting this review:

1. What is brain-based learning?

2. What are the benefits of using the computer in the math classroom?

3. How does an educator use brain-based learning techniques as well as the computer to integrate math throughout the day in the classroom?

METHODOLOGY

There are countless books, periodicals and Internet sites that address incorporating technology in the classroom. The Grant Wood Area Education Agency provided the names of some sources. The media specialists at Grant Wood are informed of the best selections to put in the professional library. The Instructional Leadership Team in the Marion Independent School District provided other district resources such as the Comprehensive School Improvement Plan. The Technology Director supplied the district Technology Plan and Internet sites that support technology integration. The books used in this paper were cited in two or more sources and were written by authors who were knowledgeable about the subject matter. The Internet Sites for additional information came from the Eisenhower National Clearinghouse for Math and Science Education. The National Clearinghouse for Math and Science Education is a source for teachers that provide relevant research in the area of math and science. The Association for Educational Communications and Technology provided additional references to support the integration of technology in to the math curriculum. The other sites came from the Educational Resources Information Center (ERIC). The terms “early childhood and technology” and “math” were used in the search. In additional searches the terms “children and computers” were used.

ANALYSIS AND DISCUSSION

Brain-Based Learning

Brain-based learning techniques are essential to classroom instruction. Sousa (1995) states the more we discover about how the brain learns, the more successful teaching and learning can be. When designing a lesson for instruction an educator should keep in mind general brain-based learning principles. Jensen (1995b) offers some key principles to consider when designing brain-based learning environments:

- A well thought-out and artfully designed encouraging environment can do 25 percent of your instructing for you.
- Students in safe and happy environments are more likely to have experience better self-esteem and enhance learning.
- Put your most important instructional visual stimuli on the walls of the classroom and up high.
- Make your entire message positive with quality and simplicity.
- The learning environment should be changed every 2-4 weeks to keep the brain curious and your learners involved.
- Have students change the learning environment. They will remember the ideas and will be able to retrieve the information.

Another brain-based principle Jensen discussed in the literature is temperature. Temperature in the room is critical. "Classrooms kept between 68-72 degrees Fahrenheit seem to feel most comfortable for the largest

majority of students" (Jensen, 1995b, p.102). Educators know that when the classroom is over 90 degrees Fahrenheit, the students do not learn important concepts. Frequently the students say their brains are too hot to learn. Since many schools in Iowa do not have the funding to have air conditioning, it is important to teach new concepts in the morning when it is cooler in the classroom.

The seating of the students plays an important part of the learning environment. The teacher must make sure the seating allows students access with various sources of information. To integrate technology effectively, the students should have access to the equipment in the learning environment. Jensen (1995a) states that for maximum learning, U shapes, V shapes, and circles are the best ways to have the students' desks or chairs. To enhance learning, change seating patterns often to create "places for group learning facilitate social learning and stimulate the brain" (Lackney, 1998, p.1). Make it easy to change types of seating arrangements for different types of instruction. The key for seating success is variety and appropriateness. Make sure the seating allows students access with various sources of information. According to Sousa (1995) when changing the seating patterns, teachers should try to put diverse types of students by each other to help facilitate discussions. Jensen (1998) states that by providing students options for different seating and lighting it increases the richness of the environment. "When you maximize your environment, teaching will be just that much easier because your students will be put into a more resourceful and receptive state

for learning" (Jensen, 1995a, p.98). Educators need to plan flexible seating arrangements to help augment learning.

The educator needs to keep in mind the aspects of how the brain learns. The information about how the brain learns is a critical aspect of the students learning environment. Sousa (1995) gives detailed explanations of how the brain learns. He puts the major points discussed in each chapter in an easy format called the "Practitioner's Corner". When presenting new concepts, use both verbal and visual cues so both hemispheres of the brain are engaged in learning. Concept mapping allows the learner to establish visual representation of relations between concepts that might be presented only verbally. Sousa goes through several types of concept mapping techniques to increase the use of teaching to both hemispheres. By engaging both hemispheres of the brain, instructors have a better chance to make new learning understandable and easier to retrieve. The story map, analogy map, K-W-L map, and different types of webbing activities are illustrated so educators engage both hemispheres of the brain. Allow direct experiences to students through role-playing and simulations. To help make connections in the brain, permit students' time to interact with each other to discuss new learning. "The brain develops better in concert with others' brains" (Lackney, 1998, p.5).

Learning occurs most quickly and with the least amount of effort during the early school years. During this time, stimulation, repetition, and novelty are essential to laying foundations for later learning" (Jensen, 1998, p.32).

Sousa (1995) states that if an educator does not provide challenge in the lesson, the student may get bored. The instructor must not have too challenging material or the student may give up. Both Jensen and Sousa emphasize to change instructional strategies often; use computers, field trips, guest speakers, pairings, games, student teaching, journaling, or multi-age projects.

Multiple Intelligences

Gardner and Hatch (1989) define intelligence as the capacity to solve problems or to fashion products that are valued in one or more cultural setting. He discusses the multiple intelligences; (a) logical-mathematical, (b) verbal-linguistic, (c) musical-rhythmic, (d) visual-spatial, (e) body-kinesthetic, (f) interpersonal, (g) intrapersonal and (h) naturalist intelligences. Students come into the classroom with different types of developed intelligences. This means each child will have his or her own distinctive set of intellectual weaknesses and strengths. The types of developed intelligences determine how easy (or difficult) it is for a student to learn information when it is presented in a particular manner.

Schools should provide ways to develop all abilities even as they continue to prefer some ways of instruction to others. Immersion focuses on how students are exposed to content.

> The thrust of orchestrated immersion specifically is to take information off the page and the blackboard and bring it to life in the minds of students. A safe general rule, therefore, is to

> ensure all senses be engaged in the design of experiences for students and that students need to have deep and rich sensory experiences of whatever is learned (Caine & Caine, 1991, p.107).

Sousa (1995) stresses the fact that educators need to incorporate all the multiple intelligences to vary instruction. "Allow direct experiences through role-playing and simulations. Allow students time to interact with each other to discuss new learning" (p.100). Jensen (1995a) states the importance of constructing learning to include multiple intelligences is necessary to encourage all learners. To incorporate multiple intelligences, the lesson plan forms in Lazear's (1991) book are beneficial. The forms provide an easy way to check which multiple intelligences are included in the lesson design. When designing a lesson, an educator should keep in mind the goal or outcome that is desired.

Math Education

The National Council of Teachers of Mathematics (2003) has written the national math standards for all teachers of mathematics (http://www.nctm.org/). These standards are an integral part to any math curriculum. The math standards cover the topics of number and operation, algebra, geometry, measurement, data analysis and probability, problem solving, reasoning and proof, communication, connections and representations. Fennell, Bamberger, Rowan, Sammons, & Suarez, (2000) provide lessons created around the national math standards.

According to the National Council of Teachers of Mathematics there are two types of standards, content and process. Number and operation, algebra, geometry, measurement, data analysis, and probability are the content standards. The content standards state what the students learn. The process standards of problem solving, reasoning and proof, communication, connections, and representation are integrated with the content standards. The process standards describe how the students learn. The way the information is taught relates to the process standards. Both the content and process standards are interconnected. The standards are not separate entities but involve integrating the information so it is meaningful to the students. Educators need to use the standards to guide the instructional design of the lessons presented during the school day. The National Council of Teachers of Mathematics standards were used as a guideline to write the Marion Independent School District's standards and benchmarks for mathematics. These standards and benchmarks were included in the Comprehensive School Improvement Plan.

Math Goals and Computer Integration

When looking at the Comprehensive School Improvement Plan for the Marion Independent School District, this author noted the goals for problem solving, number sense, geometry and patterning could be addressed by the appropriate use of software. "By presenting concrete ideas in a symbolic medium, for instance, the computer can help bridge these areas" (Clements & Swaminathan, 1995, p.1) A computer software program may bridge concrete

ideas, in a symbolic medium, by allowing students to manipulate blocks and symbols, helping them to see the relationship between concrete objects and visual representations.

There are benefits to having manipulatives on the computer. Benefits to software containing manipulatives include "flexibility, changing arrangements, storing and later retrieving configurations, linking the concrete and the symbolic by providing feedback and linking multiple representations" (Wright, 1994, p. 37). To help achieve the goals in the math curriculum, virtual manipulatives will help solve the problems of storage and retrieval. During the school day many representations that are made with pattern blocks, or other manipulatives, need to be put away depending on the schedule. The students may make a drawing or write about what they have made but they cannot retrieve the item they have worked on and keep building. The computer software will make retrieval of students' interactions with virtual blocks easier.

Educators should also keep in mind that the computer is a tool for them to use in the classroom. Clements states technology has the potential to change the way children think, what they learn, how they interact, and how teachers evaluate them (Anonymous, 2001). The computer can be useful in many ways to enrich and extend the math concepts presented. "How teachers implement computer use in their schools is critical" (Davis, 1994, p. 3). The computer is a tool that can be used for developmentally appropriate practices in an elementary classroom. Davis concludes that without successful integration, benefits of learning are limited. Teachers must know

the goal the students are working on. Teachers may decide to integrate the computer to help students attain the goal. One way is to use the computer as a learning center or integrate computer-assisted instruction in the school districts' curriculum.

Computer as a Tool

Teachers need to remember the computer is a tool for them to use appropriately to encourage student connections. The National Association for the Education of Young Children (1996) states that educators should apply the same criteria they would to any other learning experience or tool to effectively integrate technology. The teacher must decide which instructional technique to incorporate to best meet the needs of the students and the objective of the lesson. The National Council of Teachers of Mathematics (2003) supports the appropriate use of instructional technology tools as integral to the learning and teaching of mathematics and to the assessment of mathematics learning at all levels. According to the council "every school mathematics program should provide students and teachers access to computers and other appropriate technology for individual, small-group, and whole-class use, as needed, on a daily basis." One way to actively engage students in the learning process is the use of the interactive resources available on the Internet. An educator might opt to use the interactive resources available on the Internet with students interacting inside virtual reality. "Virtual manipulatives have the power to make visible that which is hard to see-and impossible to imagine" (Spicer, 2000, p. 14). The use of the

Internet provides students immediate feedback. However, the educator needs to evaluate the site and determine if the site is viable to integrate.

Computer-Assisted Instruction

Computer-assisted instruction is defined as using the computer in the delivery of instruction (Newby, Stepich, Lehman, & Russell, 2000). The computer can be used as a teacher, assistant, or a learner. Cuban (1986) states the computer is unique because it can supplement and transform the conventional classroom content and skills. The computer is used for Computer-Assisted Instruction (CAI) as well as routine clerical tasks. The routine tasks can consist of reducing paperwork, entering grades, taking attendance and preparing materials for the classroom. Ayres (2000) uses computer-assisted instruction both as a teacher and as an assistant. Through the use of computer-assisted instruction, Ayres noted an improvement on the district assessment test given to her students.

Evaluation tracks student growth with data to document the student's performance. This is necessary to help improve student performance. According to Ms. Ayres, any computer program that has spreadsheets and graphing capability can document the data. The students had little experience working math problem solving that required multiple steps. Ms. Ayres then laid manipulatives at centers and modeled simple problem solving strategies. The students showed growth in the ability to solve math story problems.

Through the use of computer-assisted instruction, a class run composite chart was developed to show the students and Ms. Ayres the total

class score. The class score was studied on a weekly basis and both the students and Ms. Ayres gave each other feedback. After the students were given manipulatives and had worked through different problems as a class, the graph did show improvement. The students were giving each other feedback in small groups and showed each other strategies they used to solve the problem. Many of the students were motivated to do better to see the class graph rise.

Learning Centers

Learning centers provide a number of ways that students can learn and or interact with a computer in a classroom. "Learning centers allow children to explore, apply newly learned skills, feel independent, be creative, and interact with peers" (Shalaway, 1997, p. 18). Whenever the students in this author's classroom are working at the computer centers, the only behavior problem that occurs is when students need to leave the computer station. They are engaged in learning through the use of software. Instructors may have students work individually, with a partner, or in a small group during learning centers. Ayres (2000) used the management strategy of "Ask three before you ask me" when a problem occurred in the learning center. This encouraged the students to ask three peers in the room before interrupting the instructor in a small group or individual lesson. This strategy fostered cooperation during learning centers. Through the use of learning centers, the educator may integrate technology in a manner to increase student learning. To understand why an educator needs to integrate technology in the

classroom it is necessary to discuss the environment within computer-assisted instruction is being used.

Learn and Retrieve Information

Trends in education may affect the role of the teacher's use of technology in the classroom. The learning style of the student and teacher must be considered. Sprague and Dede (1999) describe how technology can be effectively integrated in the curriculum using the constructivist theory. The instructor is a guide on the side while the students are using the computer as a tool to find information. The National Council of Teachers of Mathematics used the constructivist learning as a basis to integrate the mathematic standards.

> According to Ravitz, Becker, & Wong, (2000),
>
> Constructivist-Compatible Instruction is based on a theory of learning that suggests that understanding arises only through prolonged engagement of the learner in relating new ideas and explanations to the learner's own prior beliefs. A corollary of that assertion is that the capacity to employ procedural knowledge (skills) comes only from experience in working with concrete problems that provide experience in deciding how and when to call upon each of a diverse set of skills (p.1).

The constructivist theory encourages active participation by the students to ask questions and collaboratively find answers. The computer is a tool students use to help them find answers to questions. In this type of

classroom, students are actively engaged in the learning process. The teacher's role, in this approach, is to facilitate student-designed efforts (Ravitz et al., 2000). Technology has changed the teacher's role from a person giving out information to that of a facilitator.

Costa and Kallick (2000) state that the students need to see themselves as responsible for their own learning. If students see themselves responsible for their own learning they are motivated to learn. Being responsible for their own learning does not mean they must work independently. Students need many opportunities to solve problems either by themselves or with others to gain confidence. The classroom needs to be a place where students feel safe to take risks. When students are working with others, they become interdependent and see the classroom as a place to work together to solve problems. The teacher needs to model the process of working with others to solve a problem. Cooperative learning techniques are useful in the classroom to foster interdependent learning.

Teachers ought to provide a variety of strategies to students. These strategies will enable the students to experience successful problem solving (Fennell et al., 2000). Students need to feel successful to problem solve. Cooperative learning groups foster students sharing of their thinking processes with others. When students are working together, they are able to come up with more ways to solve problems. Students need to share different ways to problem solve. They will see there is more than one way to solve a math problem. Students learn and retain information in various ways. When

the students are first introduced to technology, the teacher has the option of instructing the entire class on how to use the computer. Another option is to have the teacher instruct a small group of students on how to do a task (Dockterman, 1998). The use of small group instruction allows students to interact with other students while on the computer. When working with other students each student can acquire new skills and build higher order thinking skills because they need to explain the material to each other (Sousa, 1995). To help make connections in the brain, a teacher should permit students time to interact with each other to discuss new learning. Clements and Swaminathan (1995) suggest, "Computer activities yield the best results when coupled with suitable off the computer activities" (p. 3). He continues that if you pair hands-on learning with computer activities, it may be easier for the students to remember and retrieve information when necessary. Since the retaining of information is a critical aspect of the learning process, another way to help students retain information is effective questioning techniques. The questioning techniques need to be integrated throughout different types of instruction.

Benefits of Computer-Assisted Instruction

Educators need to know the benefits of computer-assisted instruction to support the integration of technology into the curriculum through cooperative work. Wright (1994) has found through various resources that when working with partners, students with disabilities perform better than working alone. The students are socially engaged and are motivated through

the interactions with the computer and their working partner. The discussion will encourage reasoning skills in the classroom. The students' reasoning process explanation generates mathematical discussions in the classroom. Technology can be used as a tool for students to use to explain or present the process they used to solve a mathematical problem.

Drill and Practice Software

Trotter (1998) states research has shown drill and practice software can help students develop basic skills. According to Clements and Swaminathan (1995), drill and practice software has had a greater impact on at-risk students. Teachers should keep in mind that when planning lessons, at-risk students could benefit from drill and practice software. Clements has done research that has shown that drill and practice software is appropriate for at-risk students. If an at-risk student feels successful, it may increase intrinsic motivation to learn.

One opportunity to integrate drill and practice software is in the area of mathematics. Wright (1994) suggests that the greatest gains from drill and practice software occur in the lower elementary classroom. Students are provided with immediate feedback and misconceptions are noted right away. Immediate feedback is important when a student has recently learned a new concept. When children receive quick feedback, they stay interested (The Northwest Educational Technology Consortium, 2001). The computer is able to support independent practice with immediate feedback. Before the software is integrated into the curriculum, the instructor must evaluate the

software to make sure it is developmentally appropriate and meets the objectives the students need. Integration of appropriate software is important to help students attain mathematical goals. The National Council of Teachers of Mathematics (1996) say that drill and practice needs to be done in moderation. The drill and practice software has a greater impact on at-risk students. Miller, Butler, & Lee (1998) compiled the findings of several research studies that pertain to math instruction and computer-assisted instruction. "Regardless of the students' initial attitude toward math, the students' proficiency in arithmetic significantly improved" (Miller et al., p. 20).

Educator Support for Integration

Effective integration of computer-assisted instruction into the mathematical curriculum requires specific support for software selection. To evaluate software, there are several books and Internet sites to support the educator. Example lessons for technology integration in the classroom are available for educators. Several of the lessons include overlapping curriculum goals. These lessons provide easy ways to check which concepts are included in the design. Integrating technology into the math curriculum book also provides additional references for further instruction (Hamill, 1999). In the performance benchmarks, Burz (1996) suggests that technology gives the learner more control over their own learning when integrated effectively. When the student has some control over his or her own learning the student will be motivated to learn. When students come in for their portfolio night, many of them want to show their parents the work folder they have on the

computer. Teachers need to remember that technology can be used to extend and enhance the existing curriculum.

Math and Musical Intelligence

The process standard of primary communication promotes mathematical understanding. Primary communication involves the skills of reading, writing, listening, and speaking. Students clarify their thinking process through writing and speaking. Students are exposed to different ways of thinking when listening to mathematical discussions. An effective way to encourage multiple process standards is to introduce an interesting problem, allow time to solve the problem, and have students discuss how they solved the problem. Teachers should provide time for problem solving discussions. These discussions promote the students' ability to clarify and organize their thoughts. Journal writing encourages students to document their thought processes. Pictures, numbers and words are a way students can organize their thoughts. This written communication helps a teacher assess the students' mathematical thinking (Fennell et al, 2000).

Another way to use technology is to integrate music into the math curriculum. Interspersing music into the math lessons can help the students retrieve information. Clements (2001) suggests that teachers allow students to actively engage in math activities. Sousa (1995) provides an argument for the integration of music and math to increase student learning. Teachers should integrate music and math when the opportunity arises. Jensen (1995) states that specific types of music can boost concentration, knowledge,

enthusiasm, and recollection. "Music has benefits to intellectual development that transcend music itself" (Weinberger, 1998, p. 7). Weinberger discusses several studies that combine music with the visual arts to learn educational concepts. "The math learning advantage was positively correlated with the number of years of education with the music and visual arts curriculum" (p. 7). Music can be used to promote learning in other subjects and development in other areas such as individual and social awareness and adjustment. Software programs that combine mathematical concepts as well as music to foster concentration, knowledge, and recollection are available for teachers (See the Appendix for examples). The use of appropriate software that combines music and math may help children see larger connections between math and the world around them.

Sousa (1995) stresses the fact that educators need to incorporate all the multiple intelligences to vary instruction. Musical intelligence is the portion of the brain that sensitive to pitch, timber, rhythm, sounds, and responsiveness to music. "Allow direct experiences through role-playing and simulations. Allow students time to interact with each other to discuss new learning" (Sousa, 1995, p.100). Students need to make connections between new learning and knowledge they have already obtained. By allowing them time to interact with one another, this connection will be enhanced. Another way to help students to make connections in math is through the use of writing. Educators may have students use word-processing software or presentation software to integrate writing in the math curriculum.

Math and Writing

Ayres (2000) addressed how she helped students make connections in math with knowledge they already possessed. One concept she emphasized was to combine writing with story problems. The students writing described how they solved the problems. This written description provided additional documentation of the students understanding. The written anecdotal records by Ayres noted what information the students knew or did not know. Math strands could also be connected, for example, when students laid out coins, wrote how they solved the mathematical problem and then, shared how they arrived at a solution with other students. Ayres stressed the importance of the students collaborating to check the written explanation and the answer. The students could see the connections between money and numbers. It is important to connect math with other subject areas, such as written language, so they are not taught in isolation. "Each subject area is changed as well as enhanced by its connection with the other (Ayres, p.109)."

Communication is a national math standard teachers can incorporate into the classroom. Costa and Kallick (2000) feel that students need to keep journals to document their thinking processes. The computer allows another way for educators to observe the students' thinking process through the use of word processing software. Shalaway (1998) suggests that the computer is a tool a teacher can use to engage students in the learning process. Depending on the technology that is available, the educator may want to use an electronic form of a journal. The journal provides a way for students to

reflect on their problem solving strategies. The journal can provide additional comments from the students on how cooperative learning activities are working. Lloyd uses the comments to help guide and modify her math lessons. She notes the information and writes students specific feedback to encourage and compliment them. The word processing software may facilitate this documentation process. The educator may want to respond in a different font color to the students. If students are having difficulty, she provides additional individual or small group instruction. Students have a written documentation of how they have solved problems. Students refer to journals when solving new types of math problems.

Challenges With Computers and Young Children

There are challenges to using computers with young children. Many students are not developmentally ready for some concepts that are presented through the use of software. The educator must be aware of the students' learning style and instructional level. However, students may better retain the material if they are working in a small group or with a partner that is at a level appropriate for the concept. "Research on what children can do cognitively at various ages has shown that in certain respects they are more capable than we once thought" (Wright, 1994, p.139). Software has developed to a point where many graphics and icons are added, instead of text. In many programs where text is included, hearing the text read is often an option. In lower elementary classrooms, the software this author has reviewed primarily uses the mouse or arrow keys for interaction. Wright (1994) states that software

vendors need to develop more software that can be used across the curriculum. Some of the students this author has spoken with complain that they want to do more than the software allows. Some software doesn't allow the students to write math story problems and interact with other students' math problems. The appendix includes software titles available from the Grant Wood Area Education Agency. These programs include concepts and skills addressed in the national math standards.

CONCLUSIONS AND RECOMMENDATIONS

When designing a math lesson for the lower elementary classroom, the educator should keep in mind the learning objectives. Brain-based learning techniques are essential to classroom instruction. The more successful teaching and learning occurs when creating brain-based learning environments. The seating of the students plays an important part of the learning environment. The teacher must make sure the seating allows students access with various sources of information. To integrate technology effectively, the students should have access to the equipment in the learning environment. The learning environment is important in the elementary classroom.

There are benefits of using the computer in the classroom. The use of computer-assisted instruction may provide students immediate feedback. To help students retain information, include software that has overlapping goals that go across the curriculum. Software programs may help students connect

concrete objects with visual representations. Integrating computer activities are more effective when other classroom activities are tied together.

To integrate brain-based learning techniques and math throughout the day in the classroom the use of learning centers is essential. Learning centers provide a number of ways that students can interact with a computer in a classroom. Learning centers allow students an opportunity to review or reinforce skills. The students are socially engaged and can be motivated through the interactions with the computer and their working partner. Appropriate software has had a greater impact on at-risk students. Music integrated into the math lessons can help the students learn information. Students need time to interact with each other, to process the learning that occurs on the computer.

The suggestions that have been addressed throughout this paper, including, learning centers, computer-assisted instruction, music and math, and drill and practice software each integrate technology and math instruction. Educators should try to incorporate as many of the strategies listed, as they feel comfortable using. These techniques, and others, can foster learning and help students increase the knowledge they have about mathematics and technology.

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APPENDIX

Software programs that combine mathematical concepts as well as music to foster concentration, knowledge, and recollection are available for teachers from the Grant Wood Area Education Agency. Teachers may check out these programs through the media collection site at (www.aea10.k12.ia.us/).

Title	**Allie's playhouse (500292)**
Physical	Color; Sound
Copyrighted	1993
Producer	Opcode Interactive (7874)
Audience	Primary (P)
Synopsis	System requirements: Macintosh; 4 MB RAM; System 7.0 or higher; color monitor (640x480x256-colors) or higher; CD-ROM drive. Allie's Playhouse is a comprehensive collection of 16 different educational activities designed to stimulate young minds. Activities include: Math/counting; alphabet/spelling; anatomy; telling time; astronomy; problem solving; geography; music and singing; art and creativity; perception skills and more.
Edition	Macintosh version 1.2.
Grade level	Pri.

Title	**Anno's learning games (500217)**
Physical	Color; Sound
Copyrighted	1994
Producer	Putnam (8485)
Audience	Primary, Intermediate (PI)
Synopsis	System requirements: Macintosh LC II; 4 MB RAM; System 7.0 or higher; 13" monitor or larger (256 colors); CD-ROM drive. Accelerated for Power Macintosh. These games are full of fun ideas about numbers, counting, shapes and sets. At play with the elements of math and logic, kids can open their doors to higher learning. Inspired by the book Anno's Math Games.
Edition	Macintosh version.
Grade level	Pri, Int.

Title	**Awesome animated monster maker math (155529)**
Physical	Color; Sound

Copyrighted 1998

Distributor Sunburst (9709)

Producer Sunburst (9709)

Audience Primary, Intermediate (PI)

Synopsis System requirements: Macintosh 68040 or higher, including PowerPC; 8 MB RAM, 12 MB RAM recommended for PowerPC; System 7.1 or higher; col. monitor, 256 colors; 8 MB free hard disk; double-speed CD-ROM drive. 486/100 MHz or higher; 8 MB RAM; Windows 3.1, Windows 95, Windows 98; SVGA monitor, 256 colors; MPC2-compatible sound card (22 KHz, 16-Bit); 8 MB free hard disk; double-speed CD-ROM drive. Contains activities, grouped into six skill levels, which are tailored to an elementary math curriculum. Younger students will solve problems involving math literacy, map reading, operations, estimation, measurement, and logical reasoning. Upper elementary students engage in problem solving, rounding, graphing, comparisons, negative numbers, operations, and pre-algebra problems. Customizing features help teachers target appropriate skills and activity sequences. The guide includes lesson plans and student worksheets which incorporate activities found on the CD-ROM.

Edition Version 1.0s

Grade level Pri, Int.

Title **Counting on Frank : a math adventure game (500130)**

Physical Color; Sound

Copyrighted 1994

Producer Electronic Arts (3151)

Audience Primary, Intermediate (PI)

Synopsis System requirements: IBM 386 33 MHZ or greater; 4 MB RAM; MS-DOS 5.9 or higher; Windows 3.1; SVGA monitor with 256 color ability (8 bit color); Windows compatible sound card; double speed CD-ROM drive. Features a jelly bean contest, word problems and applied math activities! Sherman's store is holding a contest and kids gather clues throughout town as they work to discover the correct number of beans.

Edition Teacher's edition. MPC/Windows version 1.1.

Title **Dr. Seuss kindergarten (147967)**

Physical Color; Sound

Copyrighted 1998

Producer Broderbund (1225)

Audience Primary (P)
Series Dr. Seuss learning system (2528)
Synopsis System requirements: Macintosh 68040/20 MHz or higher; 6 MB RAM; 20 MB free hard drive; System 7.1 or higher; 13" or larger color monitor (640x480x256-colors) or higher; double-speed CD-ROM drive. 486 DX/66MHz; 8 MB RAM; 20 MB hard disk; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; double-speed CD-ROM drive. A full year of reading, math & fun. Over 250 lessons. As children join Gerald McGrew in his search for exotic animals to add to his new McGrew's Zoo, they'll work their way through activities that help them learn the alphabet, phonics, reading skills, sorting, classifying, pattern recognition, measurement and estimation, addition and subtraction and more.
Edition Macintosh Windows version.
Grade level Pri.

Title **Dr. Seuss preschool (147968)**
Physical Color; Sound
Copyrighted 1998
Producer Broderbund (1225)
Audience Early Childhood/Preschool (E)
Series Dr. Seuss learning system (2528)
Synopsis System requirements: Macintosh 68040/20 MHz or higher; 6 MB RAM; 20 MB free hard drive; System 7.1 or higher; 13" or larger color monitor (640x480x256-colors) or higher; double-speed CD-ROM drive. 486 DX/66MHz; 8 MB RAM; 20 MB hard disk; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; double-speed CD-ROM drive. A full year of reading, math & fun. Over 250 lessons. As children join Horton the Elephant in his search for the mother of a lost baby animal, they'll work through activities that help them learn the alphabet, numbers, counting, phonics, beginning reading skills, sorting, classifying, and more.
Edition Macintosh Windows version.
Grade level Pre.

Title **Early math (500282)**
Physical Color; Sound
Copyrighted 1994
Producer Sierra On-Line (9415)
Audience Primary (P)

Synopsis System requirements: Macintosh; 4 MB RAM; 13 MB hard disk space; System 6.0.7 or higher; 8 bit color monitor; CD-ROM drive. PC 386SX/20 MHz or greater; 4 MB RAM; 11 MB hard disk; Windows 3.1 or higher; sound card that supports Windows 3.1; VGA 256 colors @ 640x480; sound system; mouse; CD-ROM drive. Includes: counting, addition, subtraction, shapes, and patterns.

Edition Macintosh/Windows version.

Grade level Pri.

Title **Funny monsters for tea (141619)**

Physical Color; Sound

Copyrighted 1997

Producer Sunburst (9709)

Audience Primary, Intermediate (PI)

Synopsis System requirements: Macintosh II, LC, Centris, Performa, Quadra series or higher; 4 MB RAM; System 6.0.7 or higher; 13" or larger color monitor (640x480x256 colors) or higher; CD-ROM drive. 486 SX/25 MHz; 4-8 MB RAM; 1 MB hard disk; Windows 3.1x/95; DOS 5.0 or later; SVGA 640x480x256 color monitor; sound card; sound device; mouse; double-speed CD-ROM drive. Delightful monsters appear throughout the six activities in this learning adventure. Telling Time offers a variety of time pieces to help students learn about seconds, minutes, and hours. Alphabet Soup encourages word building skills. Up the Stairs reviews counting and basic math concepts. My Silly Poem, Musical Monsters, and Monsters in a box introduce writing poetry, musical composition and experimenting with a color pallet.

Edition Macintosh Windows version.

Grade level Pri, Int.

Title **Genie : between the whole numbers (500129)**

Physical Color; Sound

Copyrighted 1995

Producer AIMS Media (0142)

Audience Primary, Intermediate, Junior High (PIJ)

Series Children's encyclopedia of mathematics (0341)

Synopsis System requirements: Macintosh, 68020 or greater; 4 MB RAM; System 7.1 or greater; 12" color display with 256 8 bit color; CD-ROM drive. IBM 386 or greater; 4 MB RAM; Windows 3.1; VGA monitor with 256 color ability (8 bit color); sound blaster card; CD-ROM drive. Christopher finds a Genie in a bottle while playing at the seashore and asks him for help in math.

Grade level Pri, Int, Jun.

Title **Infinity city (141558)**

Physical Color; Sound

Copyrighted 1996

Producer Headbone Interactive (10955)

Audience Primary (P)

Series Gigglebone gang (2106)

Synopsis System requirements: Macintosh 68040/25 MHz or higher; 8 MB RAM; System 7.0 or higher; color monitor (640x480x256 colors) or higher; double-speed CD-ROM drive. 486 33 MHz or better; 8 MB RAM; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; mouse; double-speed CD-ROM drive. Let the Gigglebone Gang multiply your math skills with hilarious games that add up to total fun and learning.

Edition Macintosh Windows version.

Grade level Pri.

Title **Interactive math journey : an integrated approach to learning math (144341)**

Physical Color; Sound

Copyrighted 1996

Producer Learning Company (6141)

Audience Primary (P)

Synopsis System requirements: Macintosh 68030/25 MHz or higher; 8 MB RAM, hard disk; System 7.0.1 or higher; color monitor (256-colors) or higher; double-speed CD-ROM drive. 486 DX/25MHz; 8 MB RAM; 8 MB free hard disk; Windows 3.1x/95; 256 SVGA color monitor; sound card; sound device; double-speed CD-ROM drive. Includes: addition, subtraction, multiplication, fractions, measurement, estimation, pattern recognition, spatial thinking, symmetry, place value, logical reasoning, and problem solving.

Edition Macintosh Windows version.

Grade level Pri.

Title **James discovers math (500237)**

Physical Color; Sound

Copyrighted 1995

Producer Broderbund (1225)

Audience Primary (P)

Series Active mind (0019)

Synopsis System requirements: Macintosh 25 MHz 68030 or faster; 4 MB

RAM with 2.5 MB free; System 7.01 or higher; hard drive with 1 MB free; 13" monitor or larger set at 256 colors; sound manager (included); Quicktime (included); double-speed CD-ROM drive. PC 33 MHz 236DX; 4 MB RAM (8MB for Windows 95); 4 MB free hard disk; Windows 3.1 with MS/PC DOS 5.0 or higher, or Windows 95; Quicktime for Windows 2.0 (version included on CD). An elementary mathematics program that uses manipulatives as well as the CD-ROM.

Edition Windows/Macintosh version.

Grade level Pri.

Title **Math blaster : episode 1 - in search of Spot (140624)**

Physical Color; Sound

Copyrighted 1994

Producer Davidson & Associates (2434)

Audience Primary, Intermediate (PI)

Synopsis System requirements: Macintosh 68030 or greater; 5 MB RAM; 8 MB RAM recommended; System 7.1 or later; 13" or larger color display (640x480, 256 colors); hard-disk space; double-speed CD-ROM drive. PC 386/33 MHz or higher; 4 MB RAM, 8 MB recommended (8 MB RAM required for Windows 95); hard disk space; Microsoft Windows 3.1 or higher; MS-DOS 5.0 or later; 256-color SVGA display; Windows-compatible mouse and sound card; double-speed CD-ROM drive. A video arcade-style math facts game in which you rescue a green alien named Spot by completing exercises involving addition, subtraction, multiplication, division, fractions, percents, decimals, and simple geometry.

Edition Windows/MPC/Macintosh version.

Grade level Pri, Int.

Title **The Math majors (150972)**

Physical Color; Sound

Copyrighted 1997

Producer Nordic Software (11073)

Audience Primary, Intermediate (PI)

Synopsis System requirements: Macintosh; System 6.0.7 or higher; color monitor; CD-ROM drive. 386 or greater; 4 MB RAM; Windows 3.1x/95; SVGA monitor; sound card; sound device; CD-ROM drive. Students practice math within a baseball game that can be played against the computer's robot team or a friend. The opposing pitcher delivers a math problem with every pitch.

Edition Macintosh Windows version 1.3.

Grade level Pri, Int.

Title **Math munchers deluxe (140615)**

Physical Color; Sound

Copyrighted 1995

Producer MECC (7046)

Audience Primary, Intermediate (PI)

Synopsis System requirements: Mac 68030 required (Performa 575 or greater); 5 MB RAM, 8 recommended; System 7.1 or later; 13" or larger color display (640x480, 256 colors); hard-disk space; double-speed CD-ROM drive. PC 486/50 MHz or higher; 4 MB RAM, 8 recommended (8 MB RAM required for Windows 95); hard disk space; Microsoft Windows 3.1 or higher; MS-DOS 5.0 or later; 256 color SVGA display; Windows-compatible mouse and sound card; double-speed CD-ROM drive. Build math skills and confidence; addition, subtraction, multiplication, division, fractions, percents, decimals, and simple geometry.

Edition Windows/Macintosh version 1.0

Grade level Pri, Int.

Title **Math Rabbit deluxe! (144342)**

Physical Color; Sound

Copyrighted 1996

Producer Learning Company (6141)

Audience Early Childhood/Preschool, Primary (EP)

Synopsis System requirements: Macintosh 68030/25 MHz; 8 MB RAM; 40K free hard disk space; System 7.0.1 or higher; 14" or larger (640x480, 256-color) monitor; double-speed CD-ROM drive. 486DX/33 MHz; 8 MB RAM; 40 K free hard drive; DOS 5.0 or higher; Windows 3.1/95; 256-color SVGA monitor; double-speed CD-ROM drive. Four spectacular circus activities help children develop skills in counting, number recognition, adding, subtracting, and identifying equalities and inequalities.

Edition Macintosh/Windows version 2.01.

Grade level Pre, Pri.

Title **Math rock (144381)**

Physical Color; Sound

Copyrighted 1996

Producer Creative Wonders (11502)

Audience Primary, Intermediate (PI)

Series School house rock! (2279)

Synopsis System requirements: Macintosh 68040; 8 MB RAM; System 7.1 or higher; 13" or larger color monitor (640x480x256-colors) or higher; double-speed CD-ROM drive. 486; 8 MB RAM; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; double-speed CD-ROM drive. A musical math journey. Builds over 20 critical math skills. Includes: addition, subtraction, multiplication, division, fractions, decimals, integers, place value, equations, word problems, estimation, number patterns, set identification, even/odd, greater/less than, prime numbers, geometry, logic skills, strategy skills, problem solving.

Edition Macintosh Windows version.

Grade level Pri, Int.

Title **Math workshop (500330)**

Physical Color; Sound

Copyrighted 1995

Producer Broderbund (1225)

Audience Primary, Intermediate (PI)

Series Active mind (0019)

Synopsis System requirements: Macintosh 16 MHz 68030 or faster; 4 MB RAM, 2.5 MB available; System 7.01 or higher; 12" 256 color monitor; CD-ROM drive. IBM 33 MHz 386 DX or better; 4 MB RAM, 2.5 MB available; 8 MB RAM with Windows 95; 4 MB hard disk available; Super VGA graphics (640x480, 256 color); Windows 3.1 or Windows 95; Windows compatible sound device; CD-ROM drive. Computation and problem solving skills.

Edition Windows/Macintosh version.

Grade level Pri, Int.

Title **Mathville mindway : math challenge with the excitement of a carnival midway (141569)**

Physical Color; Sound

Copyrighted 1996

Producer VR Didatech (10953)

Audience Primary, Intermediate (PI)

Series Mathville (2108)

Synopsis System requirements: Macintosh; 8 MB RAM; System 7.0 or higher; color monitor (640x480x256 colors) or higher; CD-ROM drive. 486; 8 MB RAM; System 7.0 or higher; color monitor; 8 bit sound card; sound device; CD-ROM drive. Midway games for grades 3 to 5. Includes: addition, subtraction, multiplication & division; fraction & decimal concepts; place value; estimation; divisibility, inequalities; Venn diagrams & sorting; numeric &

geometric pattern recognition; 2 and 3-D geometric shapes; symmetry, flips & turns; probability, chance and data graphs; grids & directions; balancing mass.

Edition Macintosh Windows school version.

Title **Mighty Math carnival countdown (145398)**

Physical Color; Sound

Copyrighted 1996

Producer Edmark (2956)

Audience Primary (P)

Series Mighty math (2252)

Synopsis System requirements: Macintosh 68030/25 MHz or higher; 4 MB RAM (1,900 K unused); System 7.0.1 or higher; 13" or larger color monitor (640x480x256-colors) or higher; double-speed CD-ROM drive. 486 Pentium 33MHz or better 8 MB RAM; 5 MB hard disk; Windows 3.1x/95; SVGA 640x480x256 color monitor; sound card; sound device; double-speed CR-ROM drive. Builds basic concepts and problem-solving skills required for math success! Includes: problem solving & logic; place value (1's, 10's, 100's); addition & subtraction; sorting & classification; early multiplication & division.

Edition Macintosh Windows version.

Grade level Pri.

Title **Millie's math house (500204)**

Physical Color; Sound

Copyrighted 1994

Producer Edmark (2956)

Audience Primary (P)

Synopsis System requirements: Macintosh; 4 MB RAM (8 recommended) System 7.0.1 or higher; 13" monitor, 256 color required; CD-ROM drive (double-speed or faster). 386DX/33 NHz (486/33 MHz or better recommended) 4 MB RAM (8 recommended); hard disk with 2 MB free; Windows 3.1 (enhanced mode) or Windows 95 or later; Super VGA 640x480 (256 colors, or more, required); mouse; Windows-compatible sound-output device; CD-ROM drive (double-speed or faster.) Capture's children's imaginations with playful characters, humorous animation and catchy music. In six fun-filled activities students explore fundamental math concepts as they learn about numbers, shapes, patterns, and sequencing. All directions and feedback are spoken or represented graphically; reading is not required.

Edition Win/DOS/Mcintosh version 1.0.

Grade level Pri.

Title **Ms. Infinity's math mansion - first grade (151010)**

Physical Color; Sound

Copyrighted 1998

Producer Rainbow (8526)

Audience Primary (P)

Synopsis System requirements: Macintosh 68030/33 MHz or higher; 6 MB RAM; System 7.1 or higher; color monitor (640x480x256-colors) or higher; 2X CD-ROM drive. 486 /66MHz; 8 MB RAM; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; 2X CD-ROM drive. Based on the latest NCTM guidelines for math instruction. Each major concept of mathematics is represented in the program by a room in the mansion. Each of these seven rooms leads to four activities focused on that particular strand. Provides an overview of the seven concepts (rooms) and twenty-eight objectives (activities). Concepts include: numeration, geometry, data collection, patterns, problem solving, measurement, computation.

Edition Macintosh Windows version.

Grade level Pri.

Title **Ms. Infinity's math mansion - kindergarten (151009)**

Physical Color; Sound

Copyrighted 1998

Producer Rainbow (8526)

Audience Primary (P)

Synopsis System requirements: Macintosh 68030/33 MHz or higher; 6 MB RAM; System 7.1 or higher; color monitor (640x480x256-colors) or higher; 2X CD-ROM drive. 486 /66MHz; 8 MB RAM; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; 2X CD-ROM drive.Based on the latest NCTM guidelines for math instruction. Each major concept of mathematics is represented in the program by a room in the mansion. Each of these seven rooms leads to four activities focused on that particular strand. Provides an overview of the seven concepts (rooms) and twenty-eight objectives (activities). Concepts include: numeration, geometry, data collection, patterns, problem solving, measurement, computation.

Edition Macintosh Windows version.

Grade level Pri.

Title **Ms. Infinity's math mansion - second grade (151011)**

Physical Color; Sound

Copyrighted 1998
Producer Rainbow (8526)
Audience Primary (P)
Synopsis System requirements: Macintosh 68030/33 MHz or higher; 6 MB RAM; System 7.1 or higher; color monitor (640x480x256-colors) or higher; 2X CD-ROM drive. 486 /66MHz; 8 MB RAM; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; 2X CD-ROM drive. Based on the latest NCTM guidelines for math instruction. Each major concept of mathematics is represented in the program by a room in the mansion. Each of these seven rooms leads to four activities focused on that particular strand. Provides an overview of the seven concepts (rooms) and twenty-eight objectives (activities). Concepts include: numeration, geometry, data collection, patterns, problem solving, measurement, computation.
Edition Macintosh Windows version.
Grade level Pri.

Title **Ms. Infinity's math mansion - third grade (151012)**
Physical Color; Sound
Copyrighted 1998
Producer Rainbow (8526)
Audience Primary (P)
Synopsis System requirements: Macintosh 68030/33 MHz or higher; 6 MB RAM; System 7.1 or higher; color monitor (640x480x256-colors) or higher; 2X CD-ROM drive. 486 /66MHz; 8 MB RAM; Windows 3.1x/95; 640x480x256 color monitor; sound card; sound device; 2X CD-ROM drive. Based on the latest NCTM guidelines for math instruction. Each major concept of mathematics is represented in the program by a room in the mansion. Each of these seven rooms leads to four activities focused on that particular strand. Provides an overview of the seven concepts (rooms) and twenty-eight objectives (activities). Concepts include: numeration, geometry, data collection, patterns, problem solving, measurement, computation.
Edition Macintosh Windows version.
Grade level Pri.

Title **NFL math (144987)**
Physical Color; Sound
Copyrighted 1997
Producer Head Coach (11659)

Audience Primary, Intermediate (PI)

Synopsis System requirements: Macintosh LC III or higher; 5 MB RAM; 12 MB free hard drive; System 7.0 or higher; 13" or larger color monitor (640x480x256-colors) or higher; double-speed CD-ROM drive. 486 DX/33MHz; 8 MB RAM; 12 MB hard disk; Windows 3.1x/95; SVGA 640x480x256 color monitor; sound card; sound device; double-speed CD-ROM drive. How to score better grades in math. It starts when kids team up with their favorite NFL clubs to tackle more than 10,000 different math questions based on pro football stats, facts, and information. Includes: addition & subtraction, multiplication and division, averages, decimals, direction & distance, equalities & inequalities, estimation, equations, fractions, measurements, and much more.

Edition Macintosh Windows version, 3rd ed.

Grade level Pri, Int.

Title **The Playroom : introduces counting and ABC's (500219)**

Physical Color; Sound

Copyrighted 1995

Producer Broderbund (1225)

Audience Primary (P)

Series Active mind (0019)

Synopsis System requirements: Macintosh 20 MHz 68030 processor or better; 5 MB RAM (8 recommended); 13" 8 bit 256 color monitor; System 7.01 or higher; 2560 K RAM; CD-ROM drive. PC386 DX 25 MHz or higher; 4 MB RAM (8 MB for Windows 95); 700K free hard disk; Windows 3.1 or higher; MS/PC-DOS 4.0 or higher; Super VGA graphics card (640x480, 256 colors); MPC sound card; mouse; CD-ROM drive. Explore reading, math and more.

Edition Windows/Macintosh version.

Grade level Pri.

Title **Reader Rabbit's kindergarten (144393)**

Physical Color; Sound

Copyrighted 1997

Producer Learning Company (6141)

Audience Primary (P)

Synopsis System requirements: Macintosh 68040/25 MHz; 8 MB RAM; 1 MB free hard disk; System 7.0.1; 13" 256-color display; double-speed CD-ROM drive; mouse. 486/33 or better; 8 MB RAM; 1 MB free hard disk; Windows 3.1/95 DOS 5.0 or higher; Windows-compatible sound card and sound device; 256-color SVGA monitor; double-speed CD-ROM drive; mouse. Develops a full

year of reading, math, and early thinking skills. Includes fun songs for your music CD player!

Edition Macintosh/Windows version 1.0.

Grade level Pri.

Title **Splish splash math (155546)**

Physical Color; Sound

Copyrighted 2001

Distributor Sunburst (9709)

Producer Sunburst (9709)

Audience Primary (P)

Synopsis System requirements: PowerPC; 32 MB RAM with 15 MB available RAM; System 7.6, 8.1, 8.5, or 9.0; 14" col. monitor with 680x480 display, 256 colors; Sound Manager, Version 3.1; 4X CD-ROM drive. Pentium 90 CPU or higher; 32 MB RAM with 15 MB available RAM; Windows 95, 98, or 2000; SVGA monitor with 680x480 display, 256 colors; SoundBlaster-compatible card; 4X CD-ROM drive. The interface is a waterworks station, containing a system of water pipes that form a pathway. Students must correctly complete the mathematic equations throughout the waterway to reach the end. Two types of games are presented: The equation game, where students complete various subtraction and addition problems and What's my rule, where students need to determine the appropriate addition or subtraction rule which would satisfy each equation.

Edition Version 1.0s.

Grade level Pri.

Title **Sunbuddy math playhouse (140861)**

Physical Color; Sound

Copyrighted 1997

Producer Sunburst (9709)

Audience Primary (P)

Synopsis System requirements: Macintosh 68040 or higher; 5.5 MB RAM; System 7.0 or higher; color monitor (640x480x256 colors) or higher; double speed CD-ROM drive. An on-stage performance by the fun-loving Sunbuddies creatively uses Grimm's Breman Town Musicians to present a read-along production with math-related animations hidden in each scene. The play combines counting, numbers, and reading with original music and humor.

Edition Macintosh version.

Grade level Pri.