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Computer Math Games vs. Paper-based Intervention Games: Effects on Addition Fact Fluency for Second Grade Students

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Abstract

The purpose of this action research project is to investigate the ability of computer math games versus paper-based intervention games for improving addition fact fluency. Fact fluency is the ability to answer math facts quickly and accurately. The participants were twenty-one second grade students in a transitional kindergarten through eighth grade private school in a rural setting. Of the twenty-one students, two instructional groups were created through stratified sampling and random selection. One group used computer math games to improve addition fact fluency. The other group played paper-based intervention games to increase their addition fact fluency. The two groups participated ten minutes each day for four weeks in addition to their regular whole group math instruction. The study will use quantitative methods. After the four weeks intervention, the results indicated that students who utilized paper-based games demonstrated the most growth in fact fluency.

Computer Math Games vs. Paper-based Intervention Games: Effects on Addition Fact Fluency for Second Grade Students

Many children have a hard time mastering basic addition facts. This problem has contributed to children being behind in math skills. As stated by The National Center for Educational Statistics (NCES), in 2015, 18 percent of fourth-grade students, 29 percent of eighth-grade students, and 38 percent of twelfth-grade students in the United States are performing below what is considered proficient (Mathematics Performance, 2017). These statistics show a need for improving math skills. Addition fact fluency is an important step to understanding more difficult math problems. According to Poncy, McCallum, and Schmitt (2010), "As grades advance, students become less likely to meet math proficiency standards. Overall, this data seems to suggest that students in early grades are not mastering the basic math foundations and skills necessary to acquire more advanced skills" (p. 917). As children progress, math concepts get more difficult, but students need to understand the basics facts in order to do more complex problems. Giving students the ability to master fact fluency will create a strong foundation for future success.

Addition fact fluency is the ability to immediately and accurately solve single digit math facts. In order to be successful in addition fact fluency, students must be able to state the facts and understand the facts. Understanding the math facts is important to help students use these facts to solve problems. Once students have mastered the basic facts, they are able to complete higher-level math problems. On the contrary, children who do not know the basic addition facts have a hard time completing daily work because they think it is too exhausting (Poncy et al., 2010). Giving students the ability to

achieve fact fluency decreases math anxiety and helps them complete more difficult math problems.

One method to improve basic addition fact fluency is through the use of technology. As suggested by Burke and Lawrence (2013), "11% of gains by elementary school learners in mathematics were directly attributable to technology usage" (p. 59). When using technology, students do not feel math facts are hard work, but students view them as a game. Using technology like XtraMath in the classroom motivates and engages students while learning basic math facts. As suggested by Hubbell, Kuhn, and Pitler (2012), computer-based math games, "Offer sophisticated and seamless multimedia to keep the learner engaged, and provide immediate feedback and scaffolding in order to help students understand and practice a concept" (p. 174). Many benefits come from using technology to improve addition fact fluency. Children are engaged by the color, sound, and active feedback of computer math games. With technology, computer math games can improve addition fact fluency.

Another method to improve basic addition fact fluency is using paper-based intervention math games. In order to master basic addition facts, students need to frequently practice these facts (May, 1998). When students are involved in playing games, they have the opportunity to practice and quickly state basic math facts. Using math games, students are engaged because it is fun while practicing single digit addition facts that will help them become fluent in their math facts. Student achievement in math skills increases with hands-on activities.

One weakness identified in Sioux Center Christian School's Iowa Assessment scores is fact fluency. Administration has required teachers to intentionally incorporate

math fact automaticity into the math curriculum. The teacher researcher will use computer math games and paper-based intervention games to increase fact fluency.

Literature Review

Computer Math Games

Research shows that computer math games increase fact fluency. A study by Ke (2008) on 100 fifth grade students found that computer math games improved math test scores and helped students have a positive attitude towards math. It also found that playing math games on the computer helped motivate students. The study emphasized that the computer math game programs should be used with a math curriculum (Ke, 2008).

Bahr and Rieth (1989) conducted a study on forty-six junior high students who had learning difficulties. The study used an intervention that lasted four weeks and had students working on computers processing basic math facts for ten minutes three days a week. The study found that computer games did help increase test scores of basic fact fluency (Bahr & Rieth, 1989).

Poncy, McCallum, and Schmitt (2010) conducted a research study on second grade students. The study found that children who know their facts were able to finish problems more quickly (Poncy et al., 2010). Computer games give children many chances for getting the correct answer and the feedback is instant (Poncy et al., 2010). With computer programs, students instantly know if they have the right or wrong answer and they get a chance to correct their mistakes (Poncy et al., 2010). In the program Xtra Math, when a student has a problem incorrect the student needs to type in the right answer and the program will give them the problem they had incorrect in the rotation

again. It also repeats the problems they have wrong several times. Computer math programs can help students rapidly learn facts to boost achievement (Poncy et al., 2010). As Khoo (2016) states, computer based math fact games give students the opportunity to "interact with ideas, content, and learn new things" (p. 397). The use of computers helps students learn basic math facts.

Paper-Based Intervention Games

Most research shows that paper-based intervention games can improve math scores. A study of twenty-second grade students conducted by Gorman (2015) looks at the impact of game activities on addition and subtraction facts. The findings show that game activities will improve fact fluency (Gorman, 2015). The findings conclude that the games made the activities feel like fun and not work (Gorman, 2015). As children interact with paper-based intervention games, they not only practice basic math facts, but also learn to quickly think of the answer as a part of the game aspect (May, 1998). In order to learn basic math facts students need frequent practice and the opportunity to play math games gives them a chance to practice facts in a fun way (May, 1998). While playing paper-based math games, the experience is nonthreatening (Gorman, 2015). The hands-on opportunities could include using manipulatives like number dice, cards, file folder games, and other printed materials.

According to Bright, Harvey, and Montague Wheeler (1980) a study conducted on fifth and sixth grade students looked if paper-based games were an effective way to help children memorize their multiplication facts. The study concluded the use of games did make substantial gains in students' fact fluency (Bright et al., 1980). The study also noted that the student needs math instruction along with game based interventions. When

teachers provide strategies and students are given a fun format to practice, playing games can have a positive impact on learning.

Newbury, Woolridge, Peet, and Bertelsen (2015), found that the game format provides social opportunities where children get to discuss problems, use joint thinking, and come up with answers together. Another study by Ramani and Siegler (2008) found that using paper-based games to learn a concept also improves other math skills. When children are playing together, they can talk about their thinking and learn from each other.

Methods

Participants

The action research project was conducted in a second grade classroom at Sioux Center Christian School. The school is located in a rural community in northwest Iowa. The participants of the action research project consisted of twenty-one Caucasian students. None of the students are on Individual Educational Plans (IEPs). All of the students' native language is English. The students range in age from seven to eight years old. In the classroom, there are ten girls and eleven boys.

Data Collection

The purpose of the action research is to determine if computer math games or paper-based intervention games improves addition fact fluency for second grade students. The action research will be completed five times a week for four weeks in addition to the regular whole class math curriculum. The week before the intervention begins; the STAR Math Assessment, developed by Renaissance Learning, will be administered to the students. The STAR Math Assessment is a computer-based assessment with thirty-four

questions and the assessment adjusts the level of questions based on students' responses. The report ranks students by percentile comparing the student to other students nationally in the same grade. The teacher researcher will use this data to divide the participants into two instructional groups by stratified sampling. Based on the results from the STAR Math Assessment, each group will have a similar number of above grade level, on grade level, and below grade level students. The students from each performance level will be chosen randomly by drawing names out of a hat.

In addition, the teacher made single-digit addition fact fluency pre-assessment will be given to the entire class before the intervention. The pre-assessment and post-assessment will be a teacher created worksheet from Math-Aids.com (see Appendix P & Q). The teacher made pre-assessment and post-assessment will be a paper and pencil assessment that includes 50 single digit addition problems. Students will answer as many problems as they can in one minute and the data will be recorded. The teacher researcher will compare the pre-assessment and post-assessment for the computer math games group. Likewise, the teacher will compare the data from the pre-assessment and post-assessment for the paper-based intervention games group. In addition the researcher will compare the number of problems answered correctly in one minute for each group on the pre-assessment and post-assessment.

For the next four weeks, half of the class will be working on the computer fact fluency math game XtraMath. The other half the students will be playing a paper-based intervention math fact fluency games. Both groups will spend ten minutes, each day on their fact fluency activity. During the fifth week, students will take a teacher made single-digit addition fact fluency post assessment.

The computer math game group will be using XtraMath, which is a free online game and requires the teacher to set up an account for each student. The advertisement free program begins with a pre-assessment to determine the student's current level. The program progresses in difficulty as the student masters concepts. One benefit of the program is that if a student answers incorrectly, it will give the child the correct answer, providing immediate feedback, and the student must type in the correct answer before moving on to the next problem. The incorrect problem will be repeated several times in that session. XtraMath gives the student ten seconds to answer the problem. If the student is able to answer the problem in three seconds or less, the child receives a smiley face. If the student answers it in four to ten seconds the child will receive a green check mark for correct answers. If the student is unable to answer the problem in ten seconds, the program provides the correct answer. The teacher receives a weekly report with each student's sessions and progress. The report looks at accuracy and the facts that are mastered. Technology can help each student accurately master his or her math facts.
The other half of the students in the teacher researcher's second grade classroom will be playing paper-based intervention games. Each day the students will spend ten minutes practicing addition facts using a game. The games will be played with partners, in small groups, and whole group. While playing the games students will learn the basic math facts and increase in speed. The games will give students multiple opportunities to practice basic addition facts (see Appendix A).

Card War. All face cards will be removed from a regular deck of playing cards. Partners will turn over two playing cards, add them together, and the student with the highest sum will get to keep all of the cards. If the partners have the same sum, they will

flip over three more cards and the student with the highest sum will get to keep all of the cards (see Appendix B).

Addition BINGO. In this game, the teacher will call out an addition fact to the group. The students will look for the answer on their game board. If the student finds the answer, they will cover it up on the card. Once a horizontal line of four sums is covered on the game board, the child will call out BINGO (see Appendix C).

Connect Four. In the game connect four, partners will roll two number dice and add them together. They will cover up the sum on the game board using two sided counters. The person with four numbers in a row on the game board is the winner (see Appendix D).

Addition Scoot. The teacher will place an addition problem on each desk. Students will begin by solving the addition problem on their desk and record the math fact and sum on their recording sheet. When the teacher says "scoot" the students will move to a new desk. When everyone has "scooted" to every desk, the game is finished (see Appendix E).

Build a Sandcastle Board Game. The two players each place a counter on start. Pairs of students will take turns rolling the die, and moving that many spaces. The child will answer the addition fact on the space he or she lands. If the answer is correct, the student will cover the sum on the sandcastle with a two-sided counter. If the sum is already covered on the sandcastle, the player will not cover any number on this turn. If the students land on a starfish, they can cover any number of their choice. The person to cover the last number on the sandcastle wins (see Appendix F).

Bugs! Bugs! Math Sort! The students will take turns drawing a bug addition fact card. They will solve the problem, record the fact and sum on their recording sheet, and put the addition fact card on the leaf with the correct sum. When the bug fact cards are all used, the teacher will check the answers (see Appendix G).

Kaboom. The students will take turns picking a craft stick with a math fact out of the jar. The student will solve the problem. If the student answers the fact correctly, he or she will keep the stick. If the student answers the fact incorrectly, he or she will put the stick back in the jar. If the child pulls out a stick that says KABOOM, he or she will put all of his or her sticks back in the jar (see Appendix H).

Sailor Sums Addition Game. The students will take turns rolling a die and moving that many spaces on the game board. The child will pick an addition fact card and solve it. Their partner will check the answer. If the student is correct, he or she will remain on the space. If they are incorrect, the child will move back three spaces. The students will continue playing the game until they reach the final boat on the board game (see Appendix I).

Addition Racing Game. The students will take turns picking an addition fact card and solving it. Their partner will check the answer. If the child is correct, he or she will move one space on the racetrack. If they are incorrect, the student will not move. The first student to make two laps on the racetrack wins (see Appendix J).

Football Frenzy! The student draws a math fact card and answers the sum. If the student answers incorrectly, he or she will try again next time. If the student answers correctly, the child will spin the spinner. If the student lands on fumble, he or she will loose a turn and stay in the same spot. If the child lands on penalty, the student will move

back ten yards. If the child lands on forward ten yards, he or she will move forward ten yards toward the goal. If the student lands on forward twenty yards, he or she will move forward twenty yards towards the goal. Each student will keep track of the number of touchdowns he or she makes while playing the game (see Appendix K).

Baseball Bout! The student draws a math fact card and answers the sum. If the student answers incorrectly, he or she will try again next time. If the student answers correctly, the child will spin the spinner. If the student lands on strike out, he or she will stay in the same spot. If the child lands on single, he or she will move forward one base along the baseball diamond. If the student lands on double, he or she will move forward two bases. If the student lands on triple, he or she will move forward three bases. If the student lands on home run, the child will advance to the home plate. Each student will keep track of the number of points he or she makes while playing the game (see Appendix L).

Basketball Bash! The student draws a math fact card and answers the sum. If the student answers incorrectly, he or she will try again next time. If the student answers correctly, the child will spin the spinner. If the child lands on foul, he or she will stay in the same spot. If the child lands on move back one, he or she will move the ball back one space. If the student lands on move forward two, he or she will move two spaces toward the basket. If the student lands on move forward three, the child will move three spaces towards the basket. Each student will keep track of the number of points he or she makes while playing the game (see Appendix M).

Soccer Showdown! The student draws a math fact card and answers the sum. If the student answers incorrectly, he or she will try again next time. If the student answers

correctly, the child will spin the spinner. If the child lands on penalty, he or she will move back one space. If the child lands on pass forward two, he or she will move the ball two spaces towards the goal. If the student lands on pass forward three, he or she will move three spaces toward the goal. If the student lands on move forward four, the child will move four spaces towards the goal. Each student will keep track of the number of goals he or she makes while playing the game (see Appendix N).

Boom! The students will take turns picking a math fact out of the paper bag. The student will solve the problem. If the student answers the fact correctly, he or she will keep the card. If the student answers the fact incorrectly, he or she will put the card back in the paper bag. If the child pulls out a card that says BOOM, he or she will put all of his or her cards back in the bag (see Appendix O).

The study will incorporate quantitative data. A one-minute single digit addition fact pre-assessment (see Appendix P) and post-assessment (see Appendix Q) will measure student growth. The results of the action research will determine which strategy the teacher researcher will use for math fact practice in the future.

Ethics

The action research project meets all of the requirements to be considered exempt by the Institutional Review Board (IRB). The teacher will be the researcher and the research will be completed in the classroom with the teacher researcher's students (Northwestern College Institutional Review Board, 2017). The teacher researcher is using the second grade math standards and wants to improve learning for all students (Northwestern College Institutional Review Board, 2017). Keeping names anonymous during the action research project will protect students' identities (Mills, 2014). Student

names will be assigned a letter to keep student information confidential. The paraprofessional and the teacher researcher will agree on keeping all data collection and results confidential.

Variables

The independent variables of this study are computer math games versus paper-based intervention games. The students will be using two different strategies, which are computer math games or paper-based intervention games to decide which strategy is most effective. The dependent variable is improving fact fluency. The data collection will use quantitative data. The goal of this study is to improve fact fluency for second grade students.

The STAR Math Assessment is a quantitative method that will be used to make sure the computer math games group and the paper-based intervention games group has students of similar abilities. After studying more than 10,000 students, in the STAR Math Assessment, the "correlation estimates were substantial and reflect well on the validity of STAR Math" (McBride, 2011, p 18). The reliability of the test was determined by split-half, generic, and test-retest. "The reliability estimates were very high, comparing favorable with reliability estimates typical of other published math achievement tests" (McBride, 2011, p. 18). The predictive validity for second grade included 10 studies with 33,076 students with a correlation of .63 (McBride, 2011). The concurrent validity for second grade included 49 studies with 6,400 students with a correlation of .61 (McBride, 2011). This information confirms the validity and reliability of the STAR Math Assessment.

A teacher made pre-assessment and post-assessment on single-digit addition fact fluency will provide quantitative data. The assessment will be made from Math-Aids.com. The websites states the worksheets are, “based on the common core state standards initiative for mathematics” (Single Digit Addition Worksheets, 2009). After searching the website, teacher researcher could not finding anything published stating the reliability and validity.

Findings

Data Analysis

Quantitative data analysis. The quantitative data collected from the pre-assessment and post-assessment showed none of the students decreased in fact fluency. Before the intervention, the computer math game group had a mean score of 13.7 math facts correct in one minute. The paper-based math game group had a mean score of 13.1 math facts correct in one minute. This data indicates that the groups began with students of similar abilities (Figure 1).

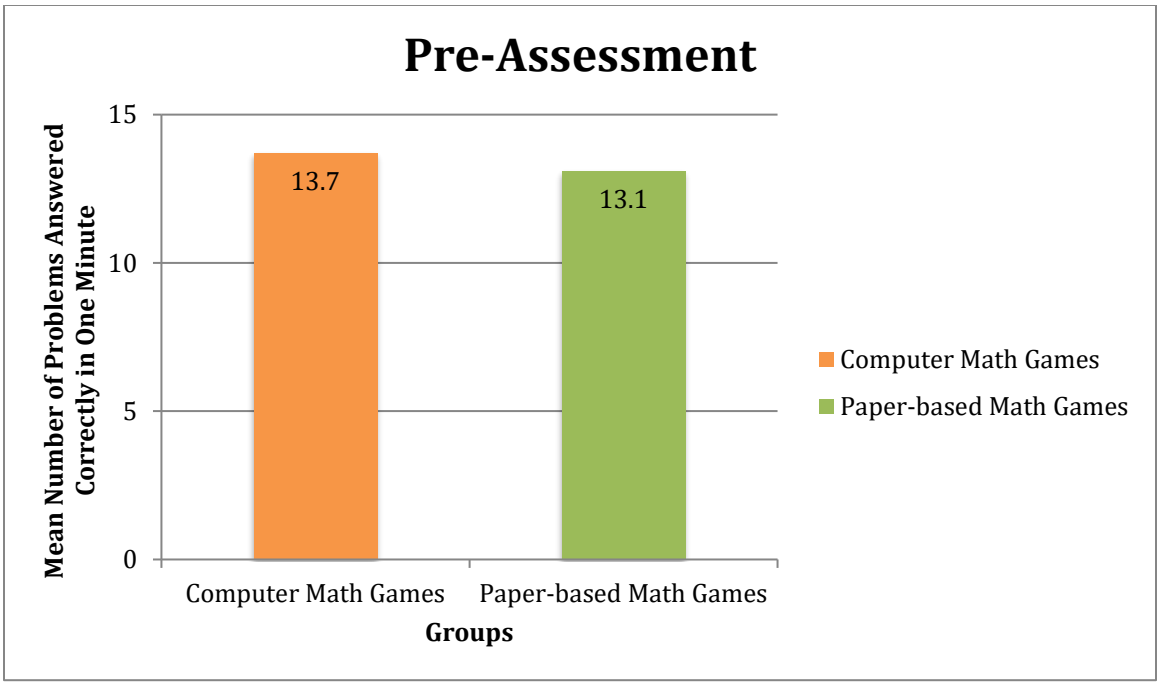

Figure 1. Comparison of Pre-Assessment Groups. The figure demonstrates both groups have similar abilities before the intervention begins.

Overall, the students in the computer math game group improved their performance by 46%. The greatest gain was 100% and the lowest gain was 0%. Student B showed the greatest improvement. Student B increased fifteen math facts per minute. Two participants Student M and R had a nine-problem improvement. Student H showed an eight-problem increase in his score. Student K demonstrated a growth of seven problems. Two participants, Student D and P, showed a six problem increased in their scores. Student F showed a five-problem increase. A growth of four problems was exhibited by Student Q. Student J increased only one math fact. Student E did not show any growth at all. None of the students showed a decline in their math fact fluency after the intervention (Table 1 and Figure 2). The performance of the computer math game group showed a mean increase of 6.4 problems (Figure 4).

Table 1

Computer Math Game Group

Student	Pre-Assessment	Post-Assessment	Number of Facts Gained	Increase From Pre-Assessment to Post-Assessment
Student B	16	31	15	94%
Student D	12	18	6	50%
Student E	16	16	0	0%
Student F	16	21	5	31%
Student H	8	16	8	100%
Student J	18	19	1	6%
Student K	11	18	7	64%
Student M	14	23	9	64%
Student P	14	20	6	43%
Student Q	11	15	4	36%
Student R	15	24	9	60%

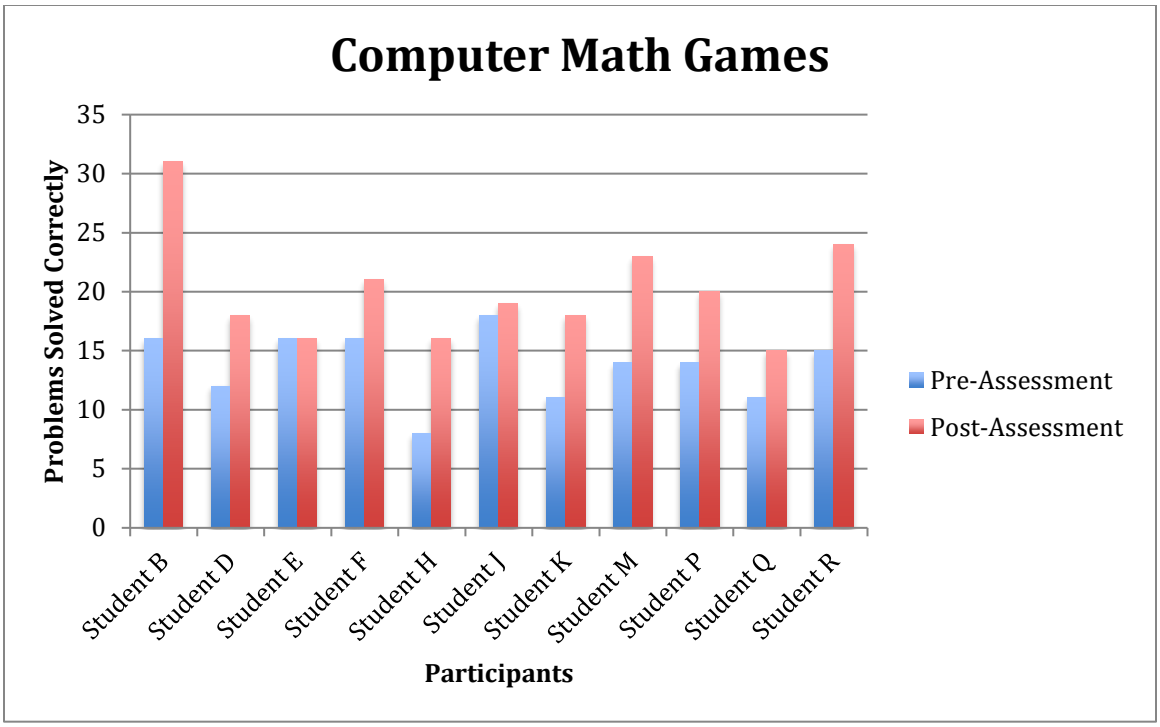

Figure 2. Computer Math Game Group. This graph shows the scores of each student from the computer math game group before and after the intervention.

The students in the paper-based math game group improved their performance by 79%. The greatest gain was 400% and the lowest gain was 14%. Students showed an increase in their fact fluency per minute compared to their fluency four weeks prior. Student U showed the greatest fact fluency increase of both groups. Student U increased her math fact fluency 23 facts per minute. Student G increased her math fact fluency 20 facts per minute. Student L exhibited a growth of eleven problems and Student C obtained a growth of ten problems. Two participants, Student S and T, showed a nine-problem increase in their scores. Student N demonstrated a growth of eight problems and Student I demonstrated a growth of seven problems. Students A and O had a three problem improvement. None of the students' scores stayed the same or decreased in paper-based math game group (Table 2 and Figure 3). The average increase of facts

solved correctly per minute for the paper-based math game group was 10.3 problems (Figure 4).

Table 2

Paper-Based Math Game Group

Student	Pre-Assessment	Post-Assessment	Number of Facts Gained	Increase From Pre-Assessment to Post-Assessment
Student A	21	24	3	14%
Student C	15	25	10	67%
Student G	5	25	20	400%
Student I	14	21	7	50%
Student L	11	22	11	100%
Student N	17	25	8	47%
Student O	15	18	3	20%
Student S	9	18	9	100%
Student T	16	25	9	56%
Student U	8	31	23	288%

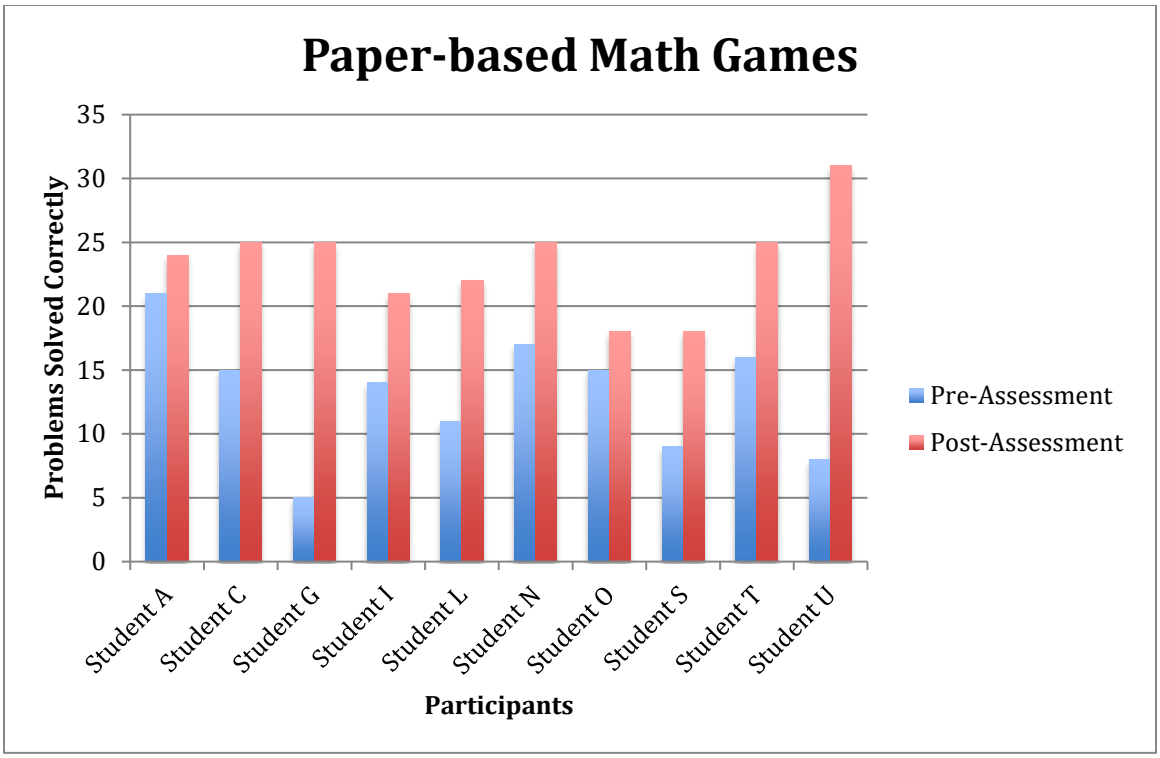

Figure 3. Paper-Based Math Game Group. This graph shows the scores of each student from the paper-based game group before and after the intervention.

At the conclusion of the intervention, the computer math game group had a mean score of 20.1 math facts correct in one minute while the paper-based math game group had a mean score of 23.4 math facts correct in one minute. The computer math game group gained an average of 6.4 math facts while the paper-based math game group gained an average of 10.3 math facts per minute (Figure 4).

Both groups started the intervention with similar math scores. After the four week intervention the paper-based math games group showed the greatest increase in fact fluency. This group scored an average of 3.3 more problems correctly than their peers in the computer math games group (Figure 4).

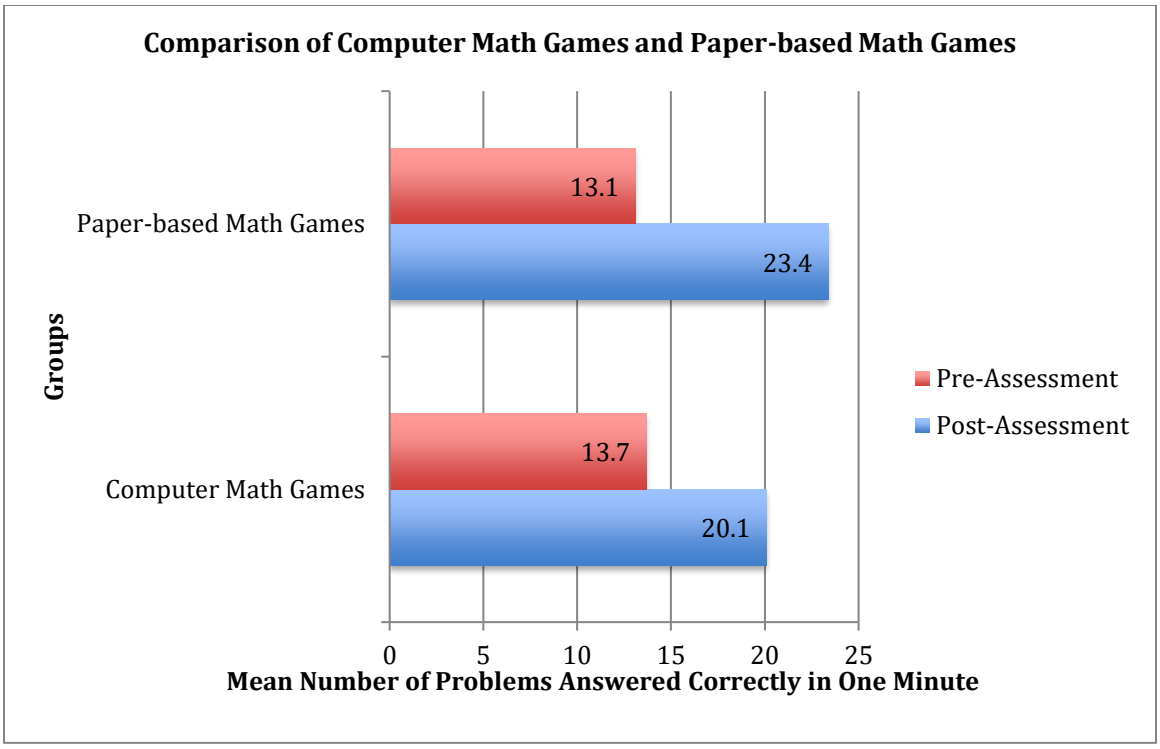

Figure 4. Comparison of Computer Math Games and Paper-based Math Games. This figure shows the average number of facts each group increased.

Discussion

Summary of Major Findings

Utilizing paper-based math games and computer math games for ten minutes a day for four weeks increases fact fluency for second grade students. The data shows that both interventions had a positive impact on fact fluency. The greatest area of improvement was for the students who participated in the paper-based math games group. The computer math games did improve fact fluency, but the results did not produce as significant of an increase.

Limitations of Study

While comparing two different ways to improve fact fluency, the study suggests some limitations that may impact the validity and reliability related to the results. The

study used a second grade classroom with twenty-one students, which made for a very small sample size. The classroom was divided into two groups that make the sample size smaller. As stated in the video "StatsCast: What is a t-test?" each group should have twenty to thirty participants (StatsCast, 2010). The small group size makes it hard to generalize if the same results would be true for all second grade students in the United States. The results could also vary with students living in different areas and unique populations. Another limitation is the teacher acting as the researcher. Sometimes a teacher automatically treats students differently to meet their individual needs. This may cause bias and skew the data. As Mills (2014) states, "Teacher researchers studying their own practices also differ from traditional educational researchers because they are committed to taking action and effecting positive educational change in their own classrooms" (p. 5). A teacher researcher cannot is not held accountable for all the different things that can impact action research.

Further Study

Future research could be conducted on effective paper-based games for improving subtraction fact fluency. The game format could be motivational and help students learn subtraction facts. Furthermore, the teacher researcher could increase the length of the intervention providing more time to learn basic facts.

Another area of further study would be to observe student engagement during the math fact activities. The teacher researcher could tally the number of times each student is off task during the activity. The teacher could write down the reason for the off task behavior if he or she is able to pinpoint a reason. A written explanation could describe patterns of off task behaviors that could impact results of fact fluency scores.

Conclusion

Many students struggle with fact fluency. Fact fluency is important because knowing basic facts is necessary for understanding more complex math problems. The action research project examined whether paper-based math games or computer math games increased students' math fact fluency. The second grade classroom participated in a four week intervention with half of the students utilizing paper-based math games while the other students used computer math games for ten minutes a day. The data from the research suggests that both groups improved in their fact fluency.

The results of the action research show that paper-based math games can significantly increase addition fact fluency and help students find success in learning. Overall, the students were very enthused about playing the math fact games. Using a game like format made math fact practice fun and exciting. In the future, the teacher researcher plans to incorporate paper-based math games to help students learn basic math facts. Paper-based math games are a stepping-stone to help students achieve math fact fluency.

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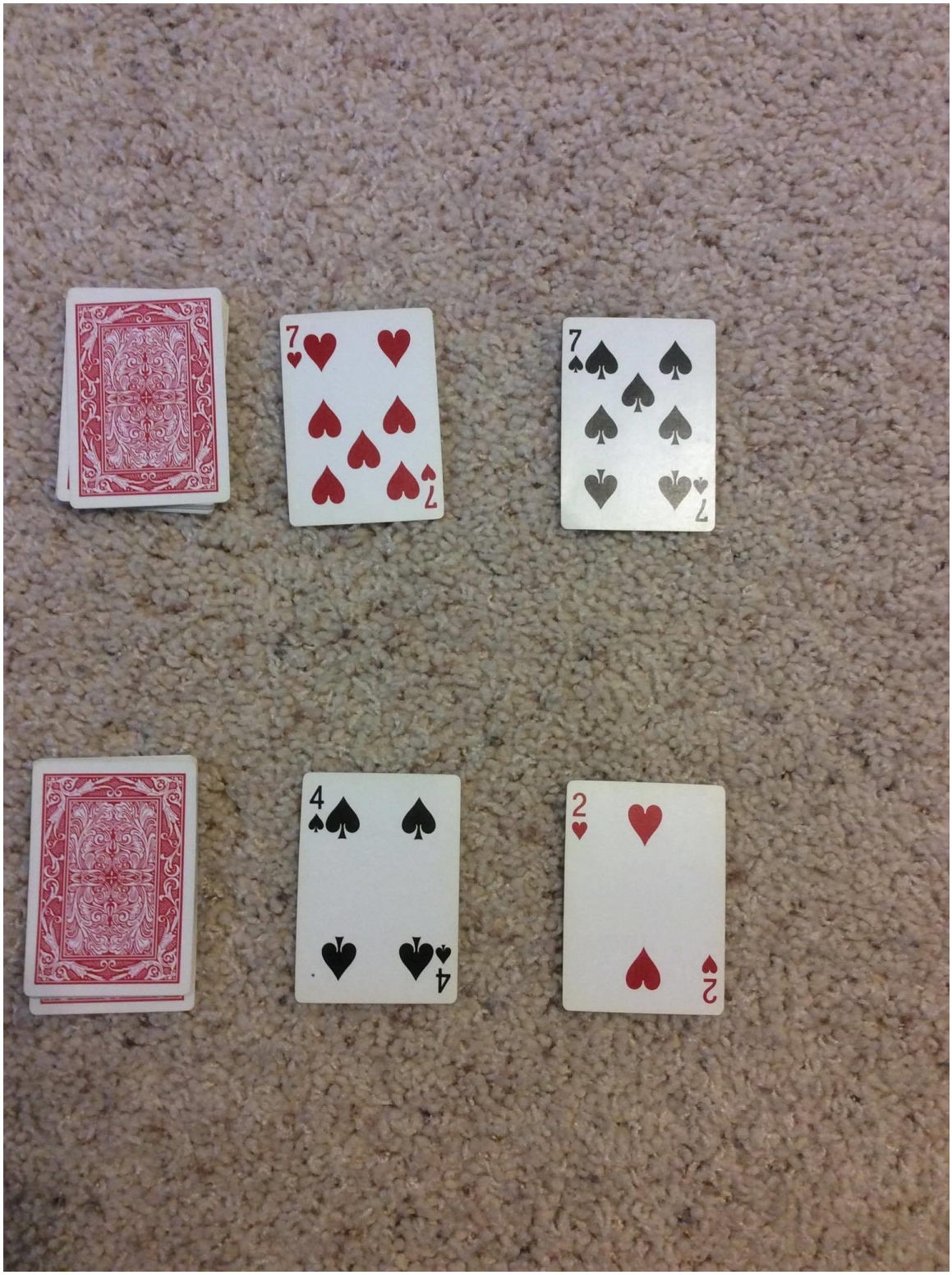
Appendix A: Intervention Math Fact Games

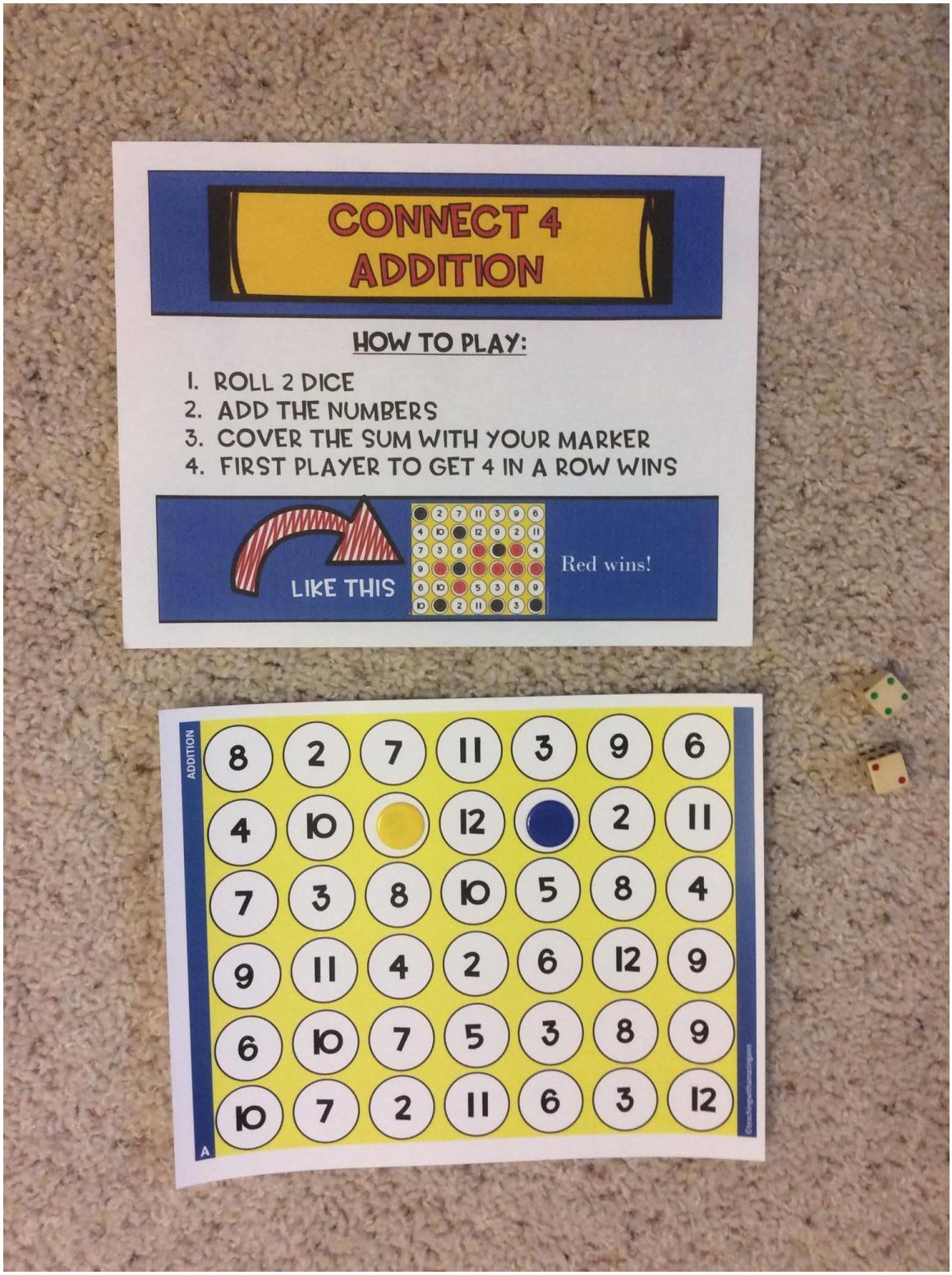
September 6	**September 7**	**September 8**	**September 11**	**September 12**
• XtraMath • Card War	• XtraMath • Addition BINGO	• XtraMath • Connect Four	• XtraMath • Addition Scoot	• XtraMath • Build a Sandcastle Board Game
September 13	**September 14**	**September 15**	**September 18**	**September 19**
• XtraMath • Bugs! Bugs! Math Sort!	• XtraMath • Kaboom	• XtraMath • Addition Scoot	• XtraMath • Sailor Sums Addition Game	• XtraMath • Addition Racing Game
September 20	**September 21**	**September 22**	**September 25**	**September 26**
• XtraMath • Football Frenzy!	• XtraMath • Baseball Bout!	• XtraMath • Basketball Bash!	• XtraMath • Soccer Showdown	• XtraMath • Kaboom
September 27	**September 28**	**September 29**	**October 2**	**October 3**
• XtraMath • Addition Scoot	• XtraMath • Boom!	• XtraMath • Card War	• XtraMath • Addition BINGO	• XtraMath • Sailor Sums Addition Game

Appendix B: Card War

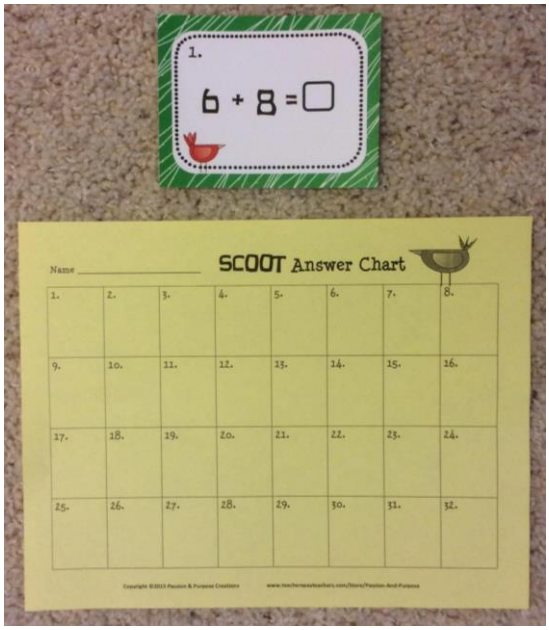


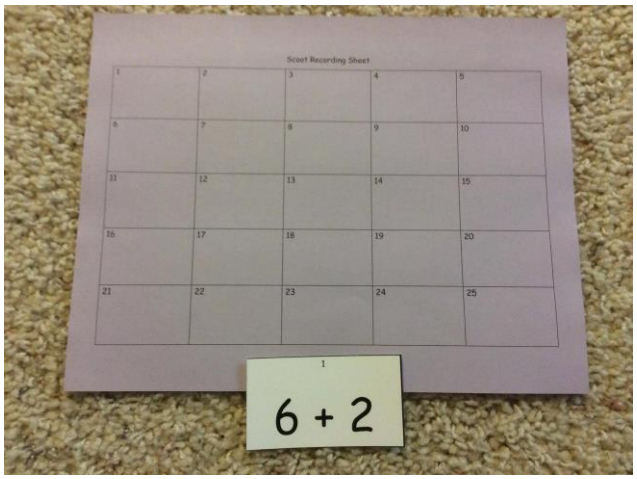
Appendix C: Addition BINGO

Appendix D: Connect Four



Appendix E: Addition Scoot



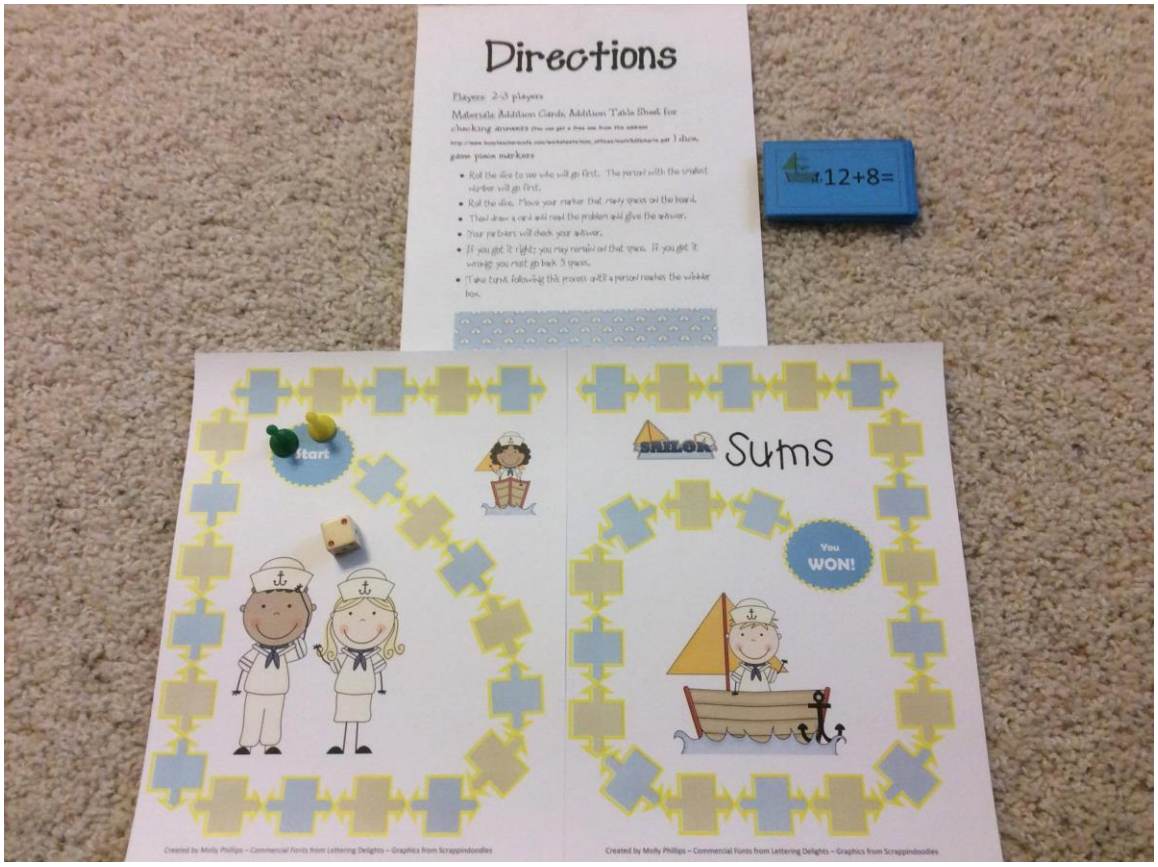


Appendix F: Build a Sandcastle Board Game

Appendix G: Bugs! Bugs! Math Sort!

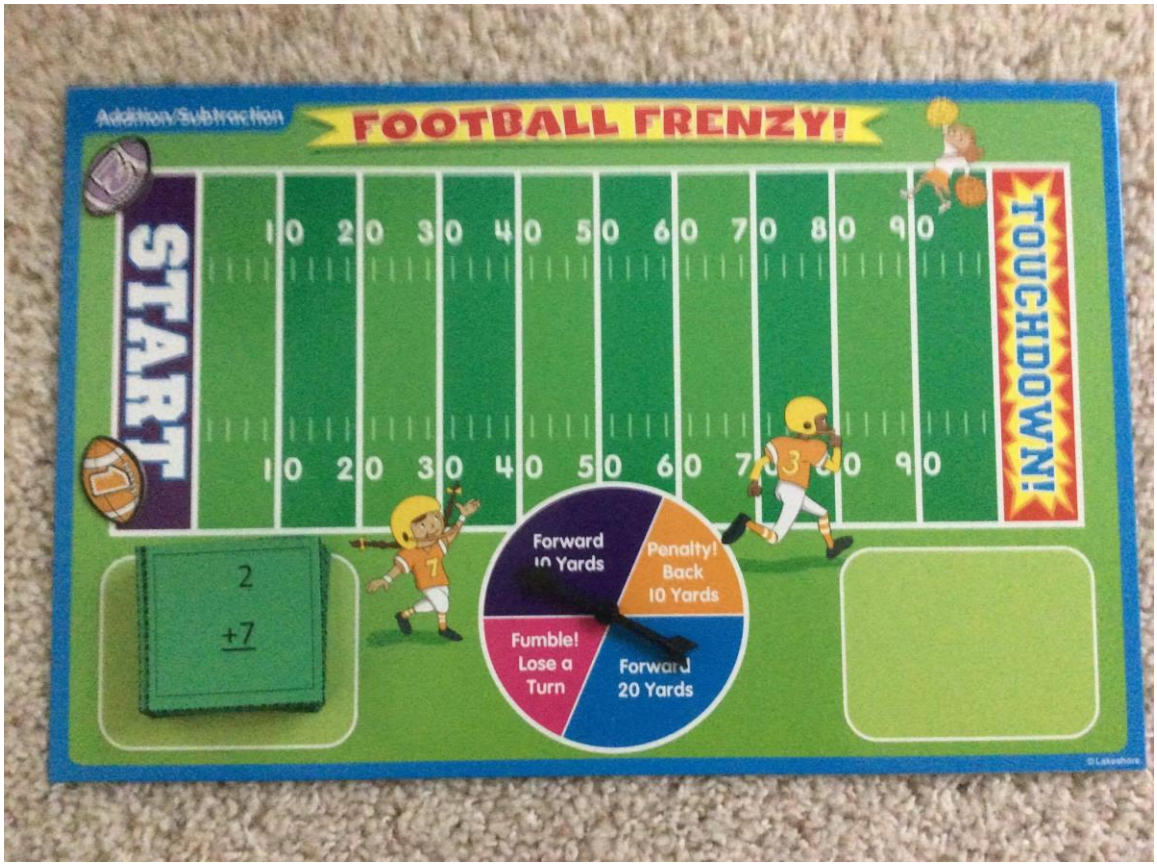
Appendix H: Kaboom

Appendix I: Sailor Sums Addition Game



Appendix J: Addition Racing Game

Appendix K: Football Frenzy!



Appendix L: Baseball Bout!

Appendix M: Basketball Bash!

Appendix N: Soccer Showdown!

Appendix O: Boom!

Appendix P: Math Fact Pre-Assessment Page One

Name : _____ Score :

Teacher : _____ Date : _____

0 + 1	8 + 7	7 + 3	7 + 6	0 + 5	8 + 4
5 + 6	5 + 9	5 + 4	6 + 9	0 + 0	2 + 8
7 + 2	0 + 6	8 + 7	1 + 3	5 + 9	8 + 4
1 + 4	5 + 1	5 + 4	5 + 2	6 + 1	6 + 9
2 + 3	0 + 3	1 + 2	0 + 4	8 + 2	2 + 6

Math-Aids.Com
Addition Worksheets

Appendix P: Math Fact Pre-Assessment Page Two

Name : _____ Score :

Teacher : _____ Date : _____

4 + 4	2 + 6	8 + 1	2 + 9	3 + 3
2 + 7	7 + 7	4 + 9	2 + 8	7 + 8
3 + 4	9 + 7	5 + 9	8 + 1	0 + 7
3 + 3	8 + 3	0 + 4	0 + 9	0 + 9

Math-Aids.Com
Addition Worksheets

Appendix Q: Math Fact Post-Assessment Page One

Name : _____ Score : _____

Teacher : _____ Date : _____

6 + 8	2 + 6	1 + 0	7 + 7	0 + 2
1 + 2	5 + 2	8 + 4	8 + 9	3 + 4
9 + 0	5 + 0	3 + 3	9 + 8	8 + 3
8 + 9	4 + 9	9 + 7	2 + 0	1 + 6
9 + 1	9 + 4	3 + 0	8 + 8	6 + 4

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Addition Worksheets

Appendix Q: Math Fact Post-Assessment Page Two

Name : _____ Score :

Teacher : _____ Date : _____

3 + 5	6 + 7	3 + 8	3 + 1	5 + 3
7 + 8	9 + 7	1 + 8	8 + 8	2 + 0
7 + 7	1 + 3	4 + 6	6 + 9	5 + 9
8 + 1	3 + 9	9 + 6	5 + 5	1 + 9
2 + 4	3 + 9	4 + 9	4 + 1	7 + 2

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