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Fostoria Intermediate Elementary School Family Math Night

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I. Research Questions

The main question undergirding my research endeavors is “how can parents become more involved in their child’s mathematics education?” As I have been researching throughout my participation in methods, I have developed several supporting questions to find out why parents may or may not be more involved in their child’s mathematics education. These include: Do parents care about their child’s education? Do parents lack the education to help their child with mathematics? Do parents understand the newly implemented Common Core State Standards for Mathematics (CCSSM)? As I research, I have been digging deeper to find scholarly works supporting these questions.

II. Literature Review

As a teacher, parental involvement in a student's education is something we hope for all of our students. However, this is not realistic for every classroom full of students. Parents may choose to not be as involved in their child's education for a number of reasons whether it be a lack of care, a lack of parental education, or a lack of time. In any case, teachers and schools have the power to try to change this by holding family nights. By implementing a family math night, parents will gain support, strategies, and materials to helping their children with mathematics at home on a regular basis.

After deciding to host a family night of any sort, one must begin to plan and organize a family night before hosting one. This comes with a series of questions including: What activities will be included? How will my guests sign in? Will there be any prizes? Will I ask parents to complete a survey? Will there be refreshments? How will I know how many people are attending? How will families be able to do these activities at home? In A Fourth-Grade Family Math Night, Jane Hall and Rita Acri (1995) describe the fourth-grade family math night they
held through a series of monthly journal entries. During their family math night, there was a registration table where each student received a button, door prize, and fast-food coupon. The parents received a program with all of the activities and directions in it. Throughout the event, refreshments were offered and someone was taking photos to document the night's success. At the end, the families were given a survey to evaluate the event. In *Family Math Night: Math Standards in Action*, Jennifer Taylor-Cox (2005) similarly discusses her experiences in planning a family math night. Taylor-Cox starts by providing the reasoning and benefits of hosting a family math night. Different from Hall and Acri, Taylor-Cox goes on to share many primary, intermediate, and general activities to be used at different stations of a family math night. In the end, Taylor-Cox delineates additional tools useful to organizing a family math night like an invitation, an evaluation form, and other masters. Both Hall and Acri and Taylor-Cox share their experiences and advice for others hosting a family math night. The authors provide several similar and different ideas and aspects for one to think about when planning a family math night.

While Hall and Acri and Taylor-Cox' family math events took on the more typical form of a one time event held after school in the evening, there are other options when considering ways to get parents involved in their child's mathematics' education. One may consider involving mathematics with another subject area, holding more routine family math nights, or even holding a math fair on a weekend. In *Math and Science Night*, Joan Sullivan and Mary Hatton (2011) discuss the math and science nights they have held for families. These nights provide informal settings for students and parents to engage in fun with math and science. The activities put on were active in their nature as explorations and challenges to promote problem solving through guided inquiry. This math and science night puts a twist on the typical family math night by integrating it with science to provide an opportunity for inquiry learning. While involving
another subject area is one option, Jean Kerr Stenmark, Virginia Thompson, and Ruth Cossey (1986) discuss how to involve parents in their children's mathematics education through family math classes in their book, *Family Math*. The book gives ideas of how to host family math classes to help create a mathematical environment in the home. The authors share activities that can be utilized at the family math classes in categories including: word problems and logical reasoning, measurement, numbers and operations, probability and statistics, time and money, geometry and spatial thinking, patterns and number charts, estimation, calculators, and microcomputers. Lastly, in *Math is FUNctional: A Math Fair for Kids*, Barbara Reys and Deanna Wasman (1998) discuss their experience developing and conducting a math fair held on a Saturday morning. The authors share their activities, which were organized into categories such as: number games, logic games and puzzles, geometry and spatial visualization, and probability and statistics. In addition, the authors share their experiences of working with college students who helped to develop and present the activities. While Sullivan and Hatton, Stenmark, Thompson, and Cossey, and Reys and Wasman did not share their experience of hosting a family math night, they do share experiences of hosting a family math event with the same purpose, making their experiences valid.

As anyone can imagine, developing, organizing, and implementing a family math night is a large task for one to undertake. As mentioned above, Reys and Wasman utilized college students to help make their math fair a success. They are not the only one's who have enlisted the help of college students. In *Family Math Nights: Collaborative Celebrations of Mathematical Learning*, Andrea Lachance (2007) discusses her experiences with planning and implementing a family math night at several different schools. In her experiences, she has used a structure involving elementary education students by having them create activities for the family math
night and teach them at a table. When using this structure, schools, teachers, parents, students, college students, and instructors all work collaboratively to celebrate the mathematical learning happening in the community. Similarly, Melissa Friedberg (2004) discusses how teachers from the University of Wisconsin-Whitewater worked together to develop and implement Family Math Fun Nights (FMFN) at elementary schools in their area in her article, *Getting Everyone Involved in Family Math*. In developing their structure, the teachers involved mathematics education students in planning and implementing the FMFN by requiring them to create an activity for a station as a part of a project for a class. Lachance and Friedberg have both shared how a large task like a family math night can be delegated to not only make a family math night most successful, but to benefit the college students by giving them experiences in working with parents and children.

When involving college students in the planning, organization, and implementation of a family math night, some perceptions and assumptions may be altered. College students tend to have little experience in the field, especially when working with low-income parents. After helping with a family math night, these assumptions are hopefully altered to become a more positive perception of parents and their involvement. In *The Effects of a Family Math Night on Preservice Teachers' Perceptions of Parental Involvement*, Tim Jacobbe, Dorene Ross, and Katrina Hensberry (2012) discuss their study of the impact a family math night has on pre-service teachers' perceptions of low-income parents involvement in their child's education. This study stemmed from the assumptions of pre-service teachers that the parents in low-income areas are not involved in their child's education because they do not care. The authors used elementary mathematics methods students in the study to plan and implement a family math night. The study found that events like family math nights can help the pre-service teachers communicate with the
parents and negate these false assumptions. Jacobbe, Ross, and Hensberry provide a valid perspective not typically studied in the area of family math nights.

While one aspect to study of a family math night could be the pre-service teachers, another could be the long term effect of how a family math night impacts the mathematics done at home between parents and students. Marlene Kliman (2006) discusses her study on involving families in the regular integration of math game playing at home in her article, *Math Out of School: Families Math Game Playing at Home*. In her study, Kliman distributed games involving mathematics to 30 parents across the nation who have children ages 7 to 13. In conclusion, she found families with children under age 10 were more likely to continue playing the games throughout time. Those families who played often also found ways to integrate the games into everyday life. Kliman's study was not done following a family math night but similar effects could occur after a family math night. Danielle Legnard and Susan Austin (2014) also discuss mathematics being done in the home through a math promise in their article, *The Math Promise: Celebrating at Home and School*. The article discusses parents and children creating a math promise as a way to celebrate mathematics at home and school. In this math promise, family members would promise to devote mathematical time together. This time does not have to be separate from everyday activities as it can simply be tied in to a car ride, a trip to the grocery store, or building a fort. Legnard and Austin's research does not follow a family math night either. However, a family math night could be a place where parents and children make this math promise in order to continue working with mathematics at home on a regular basis. Both Kliman and Legnard and Austin mention making mathematics a part of everyday life and the daily routine as a way to do math at home. In *Math, Math Everywhere*, Lester Laminack (2002) writes to parents offering suggestions to involve children in mathematics at home. He advises parents
on ways to engage their child in mathematics that occurs in everyday life like prices per unit at
the grocery store or gas mileage in the car. These are practical ways to engage a child in
mathematics that applies to the real world, similar to what Kliman and Legnard and Austin’s
research concluded. Maureen Stearns' (2013) research also supports the idea of mathematics
becoming a part of the daily routine. In her article, *Learning Math: Why Kids Get Frustrated and
What Parents Can Do*, she shares that math is an essential piece of a child's education, even
throughout college. When it comes to parental support, sometimes parents are not available or
unable to help. Even if parents are unable to support students in their homework, they are able to
play math games with their students at home. These games do not necessarily have to tie to the
school curriculum but rather tie into everyday life and daily routines through estimation,
counting, values, or multiplication in order to build number sense. The effects of parents and
students doing math at home is beneficial to student development of mathematical concepts.
Kliman, Legnard and Austin, Laminack, and Stearns have all proven that mathematics done in
the home on a regular basis does not have to be an extra activity, but rather can be integrated into
everyday life and still benefit the students mathematically. Family math nights could have the
potential to initiate this mathematics happening in the homes of students.

As mathematics is integrated into regular home life, ways to incorporate technology is
likely to become a question of the child living in our digital world. The good news is, there are
plenty of ways to incorporate educational, mathematic games at home. In *You Don't Need and
iPad for These Web Apps!*, Juan Carlos Venegas (2013) discusses several math and language arts
web apps that are free and available on iPads, tablets, desktops, and laptops. Venegas
recommends a few math apps he considers fun, educational, engaging, and appropriate for
students including: CarrotSticks, Khan Academy, Math Arcade Games, and Math Motorway.
Venegas proves the accessibility and availability of technology in the home to do mathematics. Similarly, Catherine Attard (2013) discusses the use of technology, specifically iPads, in the teaching of primary mathematics in the classroom. In her article, *Teaching with Technology: iPads and Primary Mathematics*, Attard shares that iPads were not originally designed to be utilized in the classroom, but are being implemented more and more as a way to integrate technology. In this integration, it seems harder to utilize iPads in mathematics in comparison to other subject areas. Many times when iPads are implemented into mathematics, they are used to merely replace ‘drill and practice’ worksheets with a game that essentially meets the same purpose. Instead, mathematics educators should be looking to utilize applications in order to promote mathematical concepts with problem solving and procedural fluency. Attard goes beyond Venegas' quest for educational and engaging apps to make sure the purpose behind the usage of the apps is intentional for learning and development rather than repetitive practice.

While the technology and apps available seem bountiful, they may not be as engaging as other fun, non-educational apps. In *Learning in The Digital Age*, Marie Bjerede (2014) discusses learning for students in the digital age in regards to the apps available. With the masses of apps offered in today’s world, it can be hard for parents to find the educational app that engages and challenges their individual child. Even without the highest engagement, many students in today's digital age would prefer to do their work through an app over a piece of paper and a pencil or a book. Therefore, it can be enticing for students to work with an app to practice math or other educational topics. Venegas, Attard, and Bjerede have made a point that we are living in a digital age where students are growing up with technology around them all the time. Technology can be integrated into a student’s mathematics education, both at home and at school, in order to help them develop a mathematics foundation and concepts further.
The research done on family math nights, math at home, and the integration of technology with mathematics education all point in a positive direction for involving parents and benefiting students. If teachers hope for parents to be involved in their child's education, then they must provide opportunities to help the parents be involved. Implementing a family math night give parents the opportunity to get involved and gain support, strategies, and materials to helping their children with mathematics at home on a regular basis.

III. Proposed Activity

For my Honors Project, I am proposing to organize and implement a family math night at the school in which I am student teaching, Fostoria Intermediate Elementary School. This project is an original scholarship as I will be synthesizing the idea of involving families in mathematics education in a different way that is tailored to meet the needs of the families in the Fostoria City School District. I will make use of my knowledge of both mathematics and education to create interdisciplinary connections that work together to create a common understanding of mathematics education for the parents of students in my school.

First and foremost, my Honors Project will demonstrate oral communication to the principal of Fostoria Intermediate Elementary. I will need to clearly impart my thoughts and argue to her why she should allow me to organize and hold a family math night at her school through a prepared, purposeful presentation. Next, I will need to orally communicate with the other student teachers and general education teachers in the building to get them involved. I will need to impart my thoughts and share my opinion with them in order to foster their understanding of why a family math night would be beneficial to the parents and students in our school. Most importantly, I will be orally communicating with both students and parents during the family math night. During the event, I will work to foster understanding and potentially
promote change in the parents’ attitudes or beliefs about mathematics education and the CCSSM. Furthermore, I will be helping to foster an understanding in the students about the mathematics concepts being developed in each activity.

While developing my family math night, I will be using written communication in several forms. First, I will be sending out emails, writing letters, and creating flyers. Some of these forms of written communication will be informal as I am communicating with teachers and student teachers about information for the family math night. Other forms of written communication may be more formal and include images as I am communicating with students and parents the information for the event to entice their attendance and participation. Next, I will be using written communication when creating lesson plans for the activities at each station. All of the stations will be planned by me and presented by student teachers and teachers from the building. I will use these lesson plans to communicate the mathematical concept and activity to the person presenting it. In addition to the lesson plans, each activity will have direction sheets and take home materials for the families, which will be developed by me. These resources will have to be created in a clear and concise manner to communicate the activity and its goals to the students and parents in a way that they will be able to understand and use at home.

The development and implementation of a family math night will go above and beyond the normal student teacher requirements. This project will give me a better understanding and disposition for both the mathematics and education fields. I will not only be working with students, but parents at the family math night. In addition, I will be synthesizing what I have learned in the educations field to what I know about the mathematics field in order to stress the importance of mathematics education for students. A family math night will present a new,
complex situation beyond campus, as I will be dealing with a real world issue concerning parents and their students’ education.

Lastly, my Honors Project of holding a family math night will demonstrate critical thinking. During my time at Fostoria Intermediate Elementary School, I have recognized that parents do not seem to be involved in their child’s mathematics’ education. I have found several assumptions that could support this argument. One assumption is that parents do not care about their child’s education. Assumptions stemming from the first are that parents may be unable to help their students with math at home due to a lack of parental education or a lack of time. The grounds for belief of these assumptions are in no way concrete. These assumptions are merely based off of observation and personal opinion. Therefore, this logical construction is faulty. However, parent involvement can increase student success in the classroom. A family math night could help to increase parental involvement in students’ mathematics education through support and involvement with math at home. Parents will receive support at the family math night, which will give them strategies to use at home with their students and provide them an opportunity to work with their child mathematically. Families will be provided with take home materials at the family math night for resources to utilize when doing mathematics at home. Also, a family math night will help to increase students’ engagement and interest in mathematics and increase the students’ repertoire of study skills for mastery of concepts in mathematics.

IV. Methodology

I have chosen to organize and implement a family math night at my student teaching placement, Fostoria Intermediate Elementary School, for my Honors Project because I wanted to use my research in a way that will make a positive impact on my students, their education, and their families. With that being said, this family math night will take the form of applied research.
I will use my research to solve a practical problem: parents lack of involvement in their child’s mathematics education. A family math night will provide parents with a time to be involved with their child mathematically with the support of student teachers and teachers. In addition, parents are new to the CCSSM. Working with these standards in the form of activities at stations during a family math night will help to familiarize the parents with what the standards are in place to achieve. This family math night will work to improve the condition and issue of the lack of parental involvement in students’ mathematics education in the school and community.

I must first organize a family math night before I am able to implement it. So far, I have researched the benefits of family math nights, ways of organizing and implementing family math nights, activities used at family math nights, and how parents can engage their children mathematically at home. Using this research, I will begin to organize my family math night. I have established that my family math night will be for all grades in my building, 3-6. Therefore, I will need to choose and develop activities that are suitable for all grades as well as activities specific for each grade level. In addition, I will want activities incorporating technology and integrating with other subject areas. After choosing and developing these activities, I will create lesson plans, directions, and the materials needed for each activity. Next, I will have to seek out help from fellow student teachers and other general education teachers in my building. Then, I will have to inform students, parents, and families of the family math night occurring and entice them to come. Last but not least, I will implement the family math night on April 7, 2015 at Fostoria Intermediate Elementary School.

One challenge I will have to overcome is deciding on which activities I use based on which will benefit the students the most. I have a plethora of activities researched and will need to choose the most appropriate activities for the students and parents at each grade level and in
general. One potential limitation of my project is that I will not be able to measure the parents’ level of involvement before or after my family math night. In addition, I will not be able to see or measure the long-term effects of the family math night on parental involvement with their child’s mathematics’ education. Since this limits how I will determine the success of my family math night, I have decided to give a survey to all parents at the conclusion of the family math night. This will allow the parents who attended to give me feedback on the night. My goal is for all parents who attended to feel as if they received strategies and materials to enable them to become more involved in their child’s mathematics education on a regular basis at home. The survey I provide will allow the parents to articulate whether or not they feel they have gained the strategies and materials to successfully be involved and help their child mathematically at home.

V. Expected Results and/or Potential Conclusions

As a result of organizing and implementing a family math night at Fostoria Intermediate Elementary School, I expect to discover that parents who attended the family math night will feel as if they received strategies and materials to enable them to become more involved in their child’s mathematics education on a regular basis at home. In the greater context of knowledge in the field of education, this will provide proof that family nights can support parents in feeling involved and give them the tools and resources to be involved in their child’s education at home. In the field of mathematics, parents being involved in their child’s mathematics education at home will help students to develop mathematical concepts, number sense, problem solving, and computational fluency outside of school, in a real world context so as to provide them with a more solid foundation to build upon in school. At Fostoria Intermediate Elementary School, the organization and implementation of a family math night could prove to be a worthwhile way to get parents and potentially the community involved in the education of the children in a fun,
informal, and engaging way that can have a long-term positive impact on student success in school.

Catherine Attard's article discusses the use of iPads in the teaching of primary mathematics. While iPads were not originally designed to be utilized in the classroom, they are being implemented more and more as a way to integrate technology. In this integration, it seems harder to utilize iPads in mathematics in comparison to other subject areas. Attard lists several questions as considerations for mathematics educators to think about when integrating iPads and what purpose the iPad will serve. Many times when they are implemented into mathematics, they are used to merely replace ‘drill and practice’ worksheets with a game that essentially meets the same purpose. Instead, mathematics educators should be looking to utilize applications in order to promote mathematical concepts with problem solving and procedural fluency.

Attard's article fits into my research as it discusses the integration of technology, specifically iPads, into mathematics education. This source has been helpful to my research by providing me with considerations to think about when I am selecting applications to utilize at the technology station of my family math night. Attard’s considerations for selecting applications differ from the characteristics outlined in Juan Carlos Venegas’ article, yet both are valid. Attard has changed my thinking about the applications I will be choosing. She has brought to my attention that the applications should not be a replacement of drill and practice worksheets but rather a promotion of problem solving or fluency. I plan to use Attard's consideration questions in addition to Venegas’ characteristics in my Honors Project as I am choosing the applications for a station in my family math night.
Marie Bjerede's article discusses learning for students in the digital age in regards to the apps available. With the masses of apps offered in today's world, it can be hard for parents to find the educational app that engages and challenges their individual child. While educational apps may not have quite the engagement level of other fun apps, they are getting better. Even without the highest engagement, many students in today's digital age would prefer to do their work through an app over a piece of paper and a pencil or a book. Therefore, it can be enticing for students to work with an app to practice math or other educational topics. However, their interest may not last as long as it does for other fun, game apps like Angry Birds, for example.

Bjerede's article fits into my research as it discusses the state of the educational apps that are available in today's digital age. This source will help me to think about how the educational math apps I choose engage the students. I will use this article when choosing the educational apps for the technology station at my family math night. It has changed my thinking to not only think about the important math concepts, but the engagement of the app as well. Bjerede’s article differs from the other sources cited as it looks at the state of apps within the digital world and looks to the future for what new educational apps will be coming. Rather than giving a list of suggested educational apps like Juan Carlos Venegas’ article I cited, Bjerede studies the educational apps currently available in comparison to the fun, game apps available for children. She judges the types of apps based on the engagement level they have for children. More than likely, apps are more interesting than books or paper for children in the present, digital age even though educational apps lack in their engagement in comparison to other types of apps.

Melissa Friedberg’s article discusses how teachers from the University of Wisconsin-Whitewater worked together to develop and implement Family Math Fun Nights (FMFN) at elementary schools in their area. In developing their structure, the teachers involved mathematics education students in planning and implementing the FMFN by requiring them to create an activity for a station as a part of a project for a class. In their version of a family math night, Friedberg shares the types of activities presented including: drill and practice, problem solving, and estimation. Friedberg goes on to delineate how to coordinate a family math night by sharing guidelines, a timeline, and past problems. In the end, the University of Wisconsin-Whitewater’s family math nights have been beneficial for all parties involved.

Friedberg's article fits into my research by sharing with me the purpose, structure, and benefits family math nights can have. Her article is similar to the work I have cited by Andrea Lachance as it helps to give me new ideas on how to plan my own family math night and how to involve my fellow student teachers. Friedberg shared the different types of activities, which has changed my thinking about the types of activities I may implement. One activity I plan to use at my family math night is where the students add a sticker to their birth month to demonstrate the data collection process and creation of a graph. Friedberg also mentioned parents varying level of involvement at the event. This has changed my thinking about how a family math night may run. I previously thought if parents attended, they would automatically be participating in the activities rather than watching. However, even if parents do not participate, they are present to see their child’s participation and success with mathematics.

Hall and Acri’s article describes the fourth-grade family math night they held through a series of monthly journal entries. These entries included topics such as the planning, implementation, and reflections of the authors for the event. The authors gave ideas about buttons, brochures, photos, and refreshments as aspects to plan for the family math night. During their family math night, there was a registration table where each student received a button, door prize, and fast-food coupon. The parents received a program with all of the activities and directions in it. At the end, the families were given a survey to evaluate the event. The authors conclude by describing eight of the activities used at stations for their family math night.

Hall and Acri’s article fits into my research by providing me with ideas for my family math night. Their article helps to give me another perspective on family math nights in terms of how to plan, organize, and implement one in comparison to other works I have cited. While this article did not change my thinking about family math nights, it did solidify many of the ideas I had for planning my own family math night. In addition, I plan to adapt and utilize some of the activities listed by the authors as activities for stations at my event. For example, I like the activity titled ‘Chinese Tangrams’. I would like to adapt this activity or create one similar to it in order to highlight the students’ spatial sense at a station. Hall and Acri’s article is similar to Jennifer Taylor-Cox’s article I have cited as it discusses all aspects of hosting a family math night. However, Hall and Acri focus on a fourth grade family math night while Taylor-Cox looks at a wider grade range, both of which are helpful to my planning of a family math night for grades 3-6.

Jacobbe, Ross, and Hensberry's article discusses their study of the impact a family math night has on pre-service teachers' perceptions of low-income parents involvement in their child's education. This study stemmed from the assumptions of pre-service teachers that the parents in low-income areas are not involved in their child's education because they do not care. The authors used elementary mathematics methods students in the study to plan and implement a family math night. The students were given a pre-test and post-test around the event held at a high-poverty school. The study found that pre-service teachers enter teaching programs with negative perspectives of low-income parents. However, events like family math nights can help the pre-service teachers communicate with the parents and negate these false assumptions.

Jacobbe, Ross, and Hensberry's article fits into my research as I am a pre-service teacher with the assumption that low-income parents are not as involved and engaged in their child's education as other parents. So far I have been studying parental involvement as opposed to teacher assumptions. I have now widened my perspective that I have to take into account my own assumptions. This source helps to support my argument that a family math night should have a positive impact on parents’ involvement and engagement in their child's mathematics education. Jacobbe, Ross, and Hensberry's article is different from others I have cited as it directly studies the assumptions of pre-service teachers as opposed to investigating the benefits of family math nights. This article is beneficial to my research as other pre-service teachers will be presenting the activities I plan at a family math night where they will be working with parents.

Marlene Kliman's article discusses her study on involving families in the regular integration of math game playing at home. In her study, Kliman distributed games involving mathematics to 30 parents across the nation who have children ages 7 to 13. In conclusion, she found families with children under age 10 were more likely to continue playing the games throughout time. Those families who played often also found ways to integrate the games into everyday life. While parents recognized and valued the learning occurring within the games provided, they did not necessarily relate it to the child's learning in school. The educational materials provided for the games could only be effective if they were used, which they were not by all. This shows that accessibility to materials does not guarantee a family will utilize them. Whether or not families played, Kliman cited that all parents supported their child's learning.

Kliman's article fits into my research as it talks about the usage of provided math games at home. At my family math night, I plan to provide materials for students to take home in order to play the games from the family math night at home. Kliman's article has changed my thinking that this would encourage families to play because accessibility does not guarantee usage, which she has shown. This source has been helpful in bringing to my attention that providing materials to families to play educational math games at home will not necessarily entice them to play regularly. However, students do not necessarily need extra materials to do mathematics at home with their family. Lester Laminack and Maureen Stearns’ articles suggest mathematics can be implemented into the daily routine of a household. Whether it is on a trip, at the grocery store, or baking in the kitchen, mathematics can be found and benefit students positively.

Andrea Lachance’s article discusses her experiences with planning and implementing a family math night at several different schools. In her experiences, she has used a structure involving elementary education students. She involves her methods students by having them create activities for the family math night and teach them at a table. When using this structure, schools, teachers, parents, students, college students, and instructors all work collaboratively to celebrate the mathematical learning happening in the community. While the organization and implementation may be challenging, the invaluable experiences gained are innumerable. The pre-service teachers especially benefit from the planning and implementing of the family math night as they gain experience in working with parents and teaching children.

Lachance’s article fits into my research by sharing with me a structure to organize and implement a family math night that has been proved successful. Her article helps to give me ideas on different aspects of organizing and running a family math night to ponder for my future family math night. While some of the ideas mentioned in the article I had already thought about, it brought upon new aspects of organizing a family math night that I had not originally thought of. This article has helped to change my thinking about family math nights by giving me more details to work into my family math night. I plan to use this source in my planning of a family math night as a testimony of why the other student teachers in my school building should be involved in helping to implement a family math night and the benefits they may gain from being involved. In addition, I plan to use this source to help me create my structure to organize and implement a family math night, which may be similar to and different from Lachance’s structure.

Lester Laminack's article to parents offers suggestions to involve children in mathematics at home during math literacy week. He advises parents on ways to engage their child in mathematics that occurs in everyday life like prices per unit at the grocery store or gas mileage in the car. These are practical ways to engage a child in mathematics that apply to the real world.

Laminack's article fits into my research by providing me with ideas for how parents can engage their child in mathematics. These suggestions are practical, real world applications of mathematics concepts. In addition, they do not require an extra time commitment from parents but rather an implementation into the normal, daily routine. Laminack’s article is similar to other works I have cited including: Marlene Kliman, Danielle Legnard and Susan Austin, and Maureen Stearns. All four of these articles discuss how math can be implemented on the home front, however, Laminack wrote his article directly to the audience of parents. Laminack’s article suggests ways to involve parents and children with mathematics at home by integrating it with daily life. Kliman, Legnard and Austin, and Stearns’ articles similarly suggest implementing mathematics games and activities everyday routines so as to connect math to real life. Laminack’s article will specifically be helpful to me when engaging in discussion with parents during my family math night. It has provided me with suggestions I can offer parents to help develop their students mathematically at home. These suggestions may not be as engaging as other games and activities, but they have the potential to be. In addition, these suggestions can be integrated into the parents everyday activities in order to not require extra time that may not be available in a parent’s busy schedule.

Legnard and Austin's article discusses parents and children creating a math promise as a way to celebrate mathematics at home and school. In this math promise, family members would promise to devote mathematical time together. This time does not have to be separate from everyday activities as it can simply be tied in to a car ride, a trip to the grocery store, or building a fort. Traditionally, parents and students have made a commitment to reading and now it is time for the same concept to happen with math.

Legnard and Austin's article fits into my research by providing research on the benefits of mathematics at home. The authors show how the concept of a math promise or even just parents and children doing math at home is similar to the concept of parents reading with their child at home on a regular basis. The benefits of parents working with their child at home proves to be very powerful in the child's development of mathematics concepts and computational fluency. Legnard and Austin’s article is similar to other works I have cited such as Marlene Kliman, Lester Laminack, and Maureen Stearns. All of these articles discuss and support the benefits of parents and students doing mathematics at home. This concept, whether related to school curriculum or not, may impact a child’s mathematics development at school. While none of these articles discuss a family math night in specific, they do show the positive impact involving families, parents, and students in mathematics outside of the classroom. By planning and implementing a family math night of my own, I hope for some of these benefits to be able to be seen and that families continue to incorporate mathematics into their lives routinely.

Reys and Wasman’s article discussed their experiences developing and conducting a math fair. Their particular fair was held on a Saturday morning for fifth grade students. The authors utilized college students to organize and manage the booths at the fair. Each booth was decorated with a particular theme and some college students even dressed up according to the theme. The authors go on to share thirteen of the twenty activities put on at the booths. These activities were organized into categories such as number games, logic games and puzzles, geometry and spatial visualization, and probability and statistics. In addition, the authors share many tips for developing a mathematics fair based off of their experience in conducting their fair.

Reys and Wasman's article fits into my research by sharing the development of a mathematics fair, activities to use, and tips for creating my own event. The authors' perspective comes after putting on their first mathematics fair, which will be very helpful to me, as I will be putting on my first family math night. The tips shared by Reys and Wasman at the end of their article has changed some of my thinking in the planning and development of my family math night. It has brought some items to my attention that I did not think of previously such as what a good ratio of booths to students would be. In addition, the activities shared in this source will be very helpful in planning my event by broadening my thinking to not only activities but also the types of activities I am choosing to use. Overall, this source has been very helpful in giving me a different perspective on involving families in math as it was written based off of a first time math fair in comparison to other works I have cited that discuss family math nights.

*Education Digest, 78*(5), 38-40.

Maureen Stearns' article discusses why kids get frustrated with mathematics and what their parents can do to help. Math is an essential piece of a child's education, even throughout college. It is learned in a sequential order so as to build upon previous concepts. Therefore, one needs to be diligent in all steps of mathematics and have time to process and practice freshly learned concepts. When it comes to parental support, sometimes parents are not available or unable to help. Even if parents are unable to support students in their homework, they are able to play math games with their students at home. These games do not necessarily have to tie to the school curriculum but rather tie into everyday life and daily routines through estimation, counting, values, or multiplication in order to build number sense.

Stearns' article fits into my research by more clearly delineating why students get frustrated with mathematics and how parents can more effectively help their child. This source has shown any mathematical game can be helpful to students at the most basic level of building number sense, which is essential to all mathematics. Parents can help their child develop in mathematics without it being a part of the child's schoolwork. Stearns' has provided me with suggestions that can be helpful to share with parents at my family math night on how to incorporate math into everyday life. Stearns’ article is similar to works I have cited including Lester Laminack, Danielle Legnard and Susan Austin, and Marlene Kliman. These articles support the benefits of doing mathematics at home whether it is related to school curriculum or not, and whether it is an extra activity or incorporated into everyday routines. Stearns’ suggests the most important benefit students can gain from these types of activities: number sense.

Stenmark, Thompson, and Cossey's book discusses how to involve parents in their children's mathematics education through family math classes. To the authors, family math focuses on parents and children learning math together. Their book begins by examining a mathematical environment in terms of family math activities and mathematics within the home. The book follows with many activities in categories including: word problems and logical reasoning, measurement, numbers and operations, probability and statistics, time and money, geometry and spatial thinking, patterns and number charts, estimation, calculators, and microcomputers. These activities are preceded by a 'beginning' activities section, which includes starter activities. The authors finish by including resources delineating how to organize a family math class and a list of mathematical concepts generally covered at the different grade levels.

Stenmark, Thompson, and Cossey's book fits into my research by giving me a different perspective on how to involve families with mathematics education in comparison to other works I have cited relating to family math. This book involves parents in their students' education by holding family math classes on a more regular basis as opposed to a one-time event. This source has not necessarily changed my thinking, as family math classes are not realistic for me to organize and implement in my situation. In addition, mathematical content is listed for each grade level, which is no longer relevant with the new Common Core State Standards for Mathematics. Although certain sections may not apply, I do plan to use activities from this book as it has many activities that are categorized in a sensible manner to help me balance the different activities at my family math night.

Sullivan and Hatton's article discusses the math and science nights they have held. Family math and science nights provide an informal way for students and parents to engage in fun with math and science. The authors discuss the activities they put on in relation to their active nature as explorations and challenges to promote problem solving through guided inquiry. They go beyond discussing the setup of their family nights to discuss the key to a successful event: engaging families to attend and participate. It is likely students are excited and interested in attending, but getting parents engaged is much harder. However, without them, a family night would not be able to occur.

Sullivan and Hatton's article fits into my research as it provides an overview of the family math and science nights put on by the authors. This article sheds a different light on family math nights as it includes science as well, putting a spin on the typical family math night delineated in other sources I have cited. This source has been helpful in supporting the need for family nights to be done through guided inquiry in order to lead students to problem solve as opposed to the repetitive, drill and practice routine. While others have talked about utilizing activities to promote problem solving and fluency, none have discussed it through inquiry. Inquiry learning is a more student-based approach where students are using their inquisitions to learn on their own. Guided inquiry would have a teacher take the role of the guide to help the student in inquiring and probe for deeper and higher levels of thinking. Sullivan and Hatton’s article has been helpful in discussing problem solving and fluency through inquiry as inquiry is a much more meaningful learning process for the students.

Jennifer Taylor-Cox's book discusses all aspects of putting on a family math night. In the introduction, chapter 1, Taylor-Cox discusses why schools should host family math nights and how to organize one. Chapter two provides fifteen activities that can be utilized at primary stations. Chapter three provides fifteen activities that can be used at intermediate stations. Chapter four provides ten activities that can be used as general elementary stations. Then, in chapter five, Taylor-Cox delineates additional tools that will be useful to others organizing a family math night. These items include an invitation to parents, an evaluation form, and other masters for the activities.

Taylor-Cox's book fits into my research by sharing with me reasons to hold a family math night, how to organize one, activities, and additional tips and materials similar to the work I cited by Hall and Acri. This book helps to give me ideas on how to sell the idea of coming to a family math night to the parents at my school, in addition to my own justifications. Also, the book will help me to create and adapt activities for my family math night as I plan to have stations for each grade level 3-6, as well as some general stations. Taylor-Cox has changed my thinking slightly about family math nights as she has given me more justification of hosting a family math night with its relation to standards, manipulatives, and parental involvement. Taylor-Cox has slightly altered and solidified my ideas of why family math is so important in the mathematics education world right now with the Common Core State Standards for Mathematics.

Juan Carlos Venegas' article discusses several web apps that do not need a tablet for usage. These language arts and mathematics applications can be used on the computer as well. Venegas recommends a few apps he considers fun, educational, engaging, and appropriate. The math apps he shares include: CarrotSticks, Khan Academy, Math Arcade Games, and Math Motorway. All of these apps are free and available on iPads, tablets, desktops, and laptops, which makes them very accessible to students.

Venegas' article fits into my research by sharing with me free, educational applications. This source was very helpful as the applications recommended were all free, educational, engaging, fun, and appropriate for students. Also, it is very helpful that these applications are available on smartphones, tablets, and desktops. With that being said, a student does not have to have a tablet or iPad in order to utilize these applications at home or outside of school. I plan to use the mathematics applications shared with me in my family math night at a technology station. At this station, I plan to have iPads and Google Chromebooks available with mathematics applications ready to use. Venegas’ article is similar to Catherine Attard’s article as they are both about the integration of iPads and applications into the educational world. Venegas’ article differs from Attard’s as he looks for apps that can be used on several platforms, inside or outside of the classroom. He also looks for characteristics in applications such as being fun, engaging, educational, and appropriate. While Attard does not specifically discuss these characteristics in her considerations, they are important when looking for an app to use inside the classroom.
Timeline for Completion

- End of February: Determine all activities and write lesson plans and directions for each activity
- Beginning of March: Contact student teachers and teachers to help and be involved
- Throughout March: Collect items for prizes and bags for take home materials
- March 16, 2015: Post flyers and signs around the school
- March 16, 2015: Send home flyer with RSVP due Friday, March 20, 2015
- March 20, 2015: Collect all RSVP slips
- March 23, 2015: Contact Principal and Food Services with numbers for the provided dinner
- End of March: Have all materials and copies made for the Family Math Night
- End of March: Create Sign-in sheet, activity list for parents, and survey sheet
- April 8, 2015: Send home reminder to families
- April 9, 2015: Send home reminders to families
- April 9, 2015: Family Math Night at Fostoria Intermediate Elementary
- April 20, 2015: Submit Honors Project to Advisors for review
- May 4, 2015: Turn in Honors Project to Honors Program
Multiplication Beach Ball Poke

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Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.3.OA.C.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Learning Objectives

- At the end of the activity, each student will be able to multiply facts 1-12.

Academic Language

- Multiply

List Resources

- [https://www.teacherspayteachers.com/Product/Multiplication-Facts-Beach-Ball-Poke-FREE-250336](https://www.teacherspayteachers.com/Product/Multiplication-Facts-Beach-Ball-Poke-FREE-250336)
- 144 Beach Ball Poke cards
- Pencils

THE ACTIVITY PROCEDURES

- Place cards face down in a stack.
- Players take turns choosing a card.
- Using the point of a pencil, players ‘poke’ the correct ball by inserting the tip of the pencil through the hole.
- While the pencil is inserted, players flip the card over to see if they inserted their pencil in the correct hole.
- If correct, the players keep their card. If incorrect, they return the card to the stack.
- Continue playing until all cards have been won. The player with the most cards wins!
Multiplication Beach Ball Poke Directions

For any number of players • Ages 3rd grade to adult

OBJECT
To be the player with the most Beach Ball Poke cards at the end of the game.

MATERIALS
• 144 Beach Ball Poke cards
• 1 pencil per player

SETUP
Place the Beach Ball Poke cards face down in a stack in the center of the playing area.

GAMEPLAY
• Players take turns choosing a card.
• Using the point of a pencil, players ‘poke’ the correct ball by inserting the tip of the pencil through the hole.
• While the pencil is inserted, players flip the card over to see if they inserted their pencil in the correct hole.
• If correct, the player keeps their card. If incorrect, they return the card to the stack.
• Continue playing until all cards have been won.

WINNING
The player with the most cards at the end of the game wins!
Rounding Scoot

Your Name
Date 4/9/15
Subject/Course Math
Grade 3rd

Standards for Mathematical Content and Standards for Mathematical Practice

• CCSS.MATH.CONTENT.3.NBT.A.1: Use place value understanding to round whole numbers to the nearest 10 or 100.

Learning Objectives

• At the end of the activity, each student will be able to round whole number to the nearest ten or hundred.

Academic Language

• Round
• Whole number
• Tens place
• Hundreds place

List Resources

• https://www.teacherspayteachers.com/Product/Rounding-SCOOT-task-cardsreview-game-269188
• 28 Rounding Scoot cards
• Scoot Recording sheet (double sided)
• Answer Key
• Pencils

THE ACTIVITY PROCEDURES

• Each player begins with a Rounding Scoot card. Decide who will begin with the stack of Rounding Scoot cards.
• Each player answers the question on their Rounding Scoot card and records it on the Scoot Recording sheet.
• Next, on the command of ‘Scoot’, each player passes his or her card to the left.
  o Before playing, determine the amount of time between ‘scoots’.
• Then, each player answers the question on the new Rounding Scoot card and records the answer.
• Repeat this process until each player has answered each Scoot card.
• When completed, each player will check his or her answers with the Answer Key.
• The player with the most correct answers wins!
Rounding Scoot Directions

For 2+ players • Ages 3rd grade to adult

OBJECT
To be the player with the most correct answers to the Rounding Scoot cards.

MATERIALS
• 28 Rounding Scoot cards
• Scoot Recording sheet
• Answer Key
• Pencils

SETUP
Each player has his or her own Scoot Recording Sheet and a pencil. Each player begins with one Rounding Scoot card. Decide which player will begin with the stack of Rounding Scoot cards.

GAMEPLAY
• Each player answers the question on their Rounding Scoot card and records it on the Scoot Recording sheet.
• Next, on the command of ‘Scoot’, each player passes his or her card to the left.
  o Before playing, determine the amount of time between ‘scoots’.
• Then, each player answers the question on the new Rounding Scoot card and records their answer.
• Repeat this process until each player has answered each Rounding Scoot card.
• When completed, each player will check his or her answers with the Answer Key.

WINNING
The player with the most correct answers to the Rounding Scoot cards wins!
Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.3.NF.A.3.B: Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

Learning Objectives

- At the end of the activity, each student will be able to identify simple equivalent fractions.

Academic Language

- Identify
- Fractions
- Equivalent

List Resources

- [https://www.teacherspayteachers.com/Product/Roll-Slide-Cover-Fraction-Game-483019](https://www.teacherspayteachers.com/Product/Roll-Slide-Cover-Fraction-Game-483019)
- Roll, Slide, & Cover Game Board
- 40 chips (20 of one color, 20 of another color)
- Dice (2)

THE ACTIVITY PROCEDURES

- Choose a player to go first.
- Take turns rolling the dice.
- Slide the dice together to make a fraction.
  - The smaller number should be the numerator and the larger number should be the denominator of the fraction.
- Cover the fraction on the game board with a colored chip.
- If the fraction is already covered, the player misses a turn.
- The winner is the player with the most fractions covered in the end!
Roll, Slide, & Cover Directions

For 2 players • Ages 3rd grade to adult

OBJECT
To be the player with the most fractions covered on the Roll, Slide, & Cover Game Board at the end of the game.

MATERIALS
• Roll, Slide, & Cover Game Board
• 40 Colored chips (20 of one color, 20 of a different color)
• Dice (2)

SETUP
Each player has 20 colored chips. Place the Roll, Slide, & Cover Game Board between the two players.

GAMEPLAY
• Choose a player to go first.
• Take turns rolling the dice.
• Slide the dice together to make a fraction.
  o The smaller number should be the numerator and the larger number should be the denominator of the fraction.
• Cover the fraction on the Roll, Slide, and Cover Game Board a colored chip.
• If the fraction is already covered, the player misses a turn.

WINNING
The player with the most fractions covered on the Roll, Slide, & Cover Game Board at the end of the game wins!
**Rectangular Tetris**

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### Standards for Mathematical Content and Standards for Mathematical Practice

- **CCSS.MATH.CONTENT.3.MD.C.5**: Recognize area as an attribute of plane figures and understand concepts of area measurement.
- **CCSS.MATH.CONTENT.3.MD.C.6**: Measure areas by counting unit squares (square cm, square m, square in, square ft., and improvised units).

### Learning Objectives

- At the end of the activity, each student will be able to identify concepts of area measurement for rectangles.
- At the end of the activity, students will be able to measure the area of rectangles by counting unit squares.

### Academic Language

- Identify
- Area
- Rectangles
- Unit squares

### List Resources

- Dice (2)
- 9 x 17 grid paper
- Colored pencils

### THE ACTIVITY PROCEDURES

- A player begins by rolling the dice.
- The two numbers rolled represent the dimensions of a rectangle.
- The player shades the rectangle on the 9 x 17 grid.
- The rectangles cannot overlap.
- When a player cannot fit a rectangle on the grid, he or she is finished.
- Each player's score is calculated by counting the number of unshaded squares in the 9 x 17 grid.
- The lowest score wins!
Rectangular Tetris Directions

For 2+ players • Ages 3rd grade to adult

OBJECT
To have the fewest number of squares left on the 9 x 17 grid paper.

MATERIALS
• Dice (2)
• 9 x 17 grid paper
• Colored pencils

SETUP
Each player has his or her own pair of dice, piece of 9 x 17 grid paper, and colored pencils.

GAMEPLAY
• A player begins by rolling the dice.
• The two numbers rolled represent the dimensions of a rectangle.
• The player shades the rectangle on the 9 x 17 grid.
• The rectangles cannot overlap.
• When a player cannot fit a rectangle on the grid, he or she is finished.
• Each player's score is calculated by counting the number of unshaded squares in the 9 x 17 grid.

WINNING
The player with the fewest number of squares left on the 9 x 17 grid paper at the end of the game wins!
Tangram Puzzles

Your Name
Date 4/9/15
Subject/Course Math
Grade 3rd

Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.3.G.A.1: Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

Learning Objectives

- At the end of the activity, each student will be able to identify shapes in different categories with the same attributes.

Academic Language

- Identify
- Shapes
- Triangles
- Parallelograms
- Squares
- Rectangles
- Quadrilaterals

List Resources

- [https://www.teacherspayteachers.com/Product/FREE-Tangram-Polygon-Explorations-359156](https://www.teacherspayteachers.com/Product/FREE-Tangram-Polygon-Explorations-359156)
- 7 Tangram puzzle pieces
- Tangram Duos
- Tangram Triples
- Tangram Quads
- Tangram Polygon Challenge
- Tangram Polygon Super Challenge
- Pencils

THE ACTIVITY PROCEDURES

- Each player should have a Tangram puzzle with 7 pieces.
- Players can make tangram duos, tangram triples, tangram quads, or complete the tangram polygon challenge or tangram polygon super challenge.
- Hint: Some solutions are not possible! Players should write no solution if they are absolutely certain that it is not possible to create the given polygon.
  - For example, it is not possible to make a rectangle with two pieces, unless the rectangle is a square.
Tangram Puzzle Directions

For 1+ players • Ages 3rd grade to adult

OBJECT
To complete the Tangram Duos, Tangram Triples, Tangram Quads, Tangram Polygon Challenge, and/or Tangram Polygon Super Challenge.

MATERIALS
• 7 Tangram Puzzle Pieces
• Tangram Duos sheet
• Tangram Triples sheet
• Tangram Quads sheet
• Tangram Polygon Challenge sheet
• Tangram Polygon Super Challenge sheet
• Pencils

SETUP
Each player should have a Tangram puzzle with 7 pieces and any Tangram sheet they are choosing to complete (Tangram Duos, Tangrams Triples, Tangram Quads, Tangram Polygon Challenge, or Tangram Polygon Super Challenge)

GAMEPLAY
• Players should manipulate the Tangram Puzzle Pieces to create different polygons using different numbers of pieces according to the Tangram Duos, Tangrams Triples, Tangram Quads, Tangram Polygon Challenge, or Tangram Polygon Super Challenge sheet being completed.
• Hint: Some solutions are not possible! Players should write no solution if they are absolutely certain that it is not possible to create the given polygon.
**Factor Race**

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**Standards for Mathematical Content and Standards for Mathematical Practice**

- CCSS.MATH.CONTENT.4.OA.B.4: Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

**Learning Objectives**

- At the end of the activity, each student will be able to identify all factor pairs for a whole number.

**Academic Language**

- Identify
- Factor pair
- Whole number

**List Resources**

- [https://www.teacherspayteachers.com/Product/FREE-Factor-Race-Math-Game-225089](https://www.teacherspayteachers.com/Product/FREE-Factor-Race-Math-Game-225089)
- 12 Factor Race Cards - Basic Level
- 12 Factor Race Cards - Challenge Level
- Scratch paper
- Pencils
- Timer
- Factor Race Scoring Sheet

**THE ACTIVITY PROCEDURES**

- Stack the Factor Race Cards face down in the center.
- The player wearing the most green becomes the first leader. He or she turns over the top card and announces the target number.
- The leader sets the timer for one minute.
- Every player tries to find as many factors as possible for the target number.
- When one minute is up, everyone stops and writes their list of factors in order from least to greatest.
- Compare answers. Score points.
  - Earn one point for every correct factor that you find.
  - Lose a turn and score 0 points if a player lists a number that is not a factor of the target.
- The leader records everyone’s name and score for Round 1 on the Scoring sheet.
- Repeat the above steps for each round. The role of the leader rotates to the left for each round.
- Play until all 12 cards have been used. Add the points to find out who wins the game!
Factor Race Directions

For 2-4 players • Ages 4th grade to adult

OBJECT
To be the player to find the greatest number of factors for a target number in one minute.

MATERIALS
• 12 Factor Race Cards - Basic Level
• 12 Factor Race Cards - Challenge Level
• Scratch paper
• Pencils
• One-minute timer
• Factor Race Scoring Sheet

SETUP
Stack the Factor Race Cards face down in the center. The player wearing the most green becomes the first leader.

GAMEPLAY
• The leader turns over the top card and announces the target number.
• The leader sets the timer for one minute.
• Every player tries to find as many factors as possible for the target number.
• When one minute is up, everyone stops and writes their list of factors in order from least to greatest.
• Compare answers. Score points.
  o Earn one point for every correct factor that you find.
  o Lose your turn and score 0 points if you list a number that is not a factor of the target.
• The leader records everyone’s name and score for Round 1 on the Scoring sheet.
• Repeat the above steps for each round. The role of the leader rotates to the left for each round.
• Play until all 12 cards have been used.

WINNING
The player with the most points at the end of the game wins!
The Game of 99!

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Standards for Mathematical Content and Standards for Mathematical Practice


Learning Objectives

- At the end of the activity, each student will be able to add and subtract multi-digit whole numbers.

Academic Language

- Add
- Subtract
- Multi-digit whole numbers

List Resources

- 1 Deck of regular playing cards

THE ACTIVITY PROCEDURES

- Each player is dealt 5 regular playing cards. The remaining cards are stacked face down in the center.
- Players take turns laying down a card from their hands and then drawing another card from the deck.
- When a player lays a card down, he or she must add the value of the card to the running total of the discard pile.
- Play continues in this manner until a player is forced to go over 99, which means that player is out of the game.
- The last player left wins!
- Value of each card:
  - Ace: add 1
  - 2: add 2
  - 3: add 3
  - 4: reverse order of play
  - 5: add 5
  - 6: add 6
  - 7: skip turn
  - 8: add 8
  - 9: add 9
  - 10: subtract 10
  - Jack: add 10
  - Queen: add 10
  - King: sum immediately goes to 99
The Game of 99! Directions

For 2+ players • Ages 4th grade to adult

OBJECT
To be the last player left at the end of the game.

MATERIALS
• 1 Deck of regular playing cards

SETUP
Each player is dealt 5 regular playing cards. The remaining cards are stacked face down in the center.

GAMEPLAY
• Players take turns laying down a card from their hands and then drawing another card from the deck.
• When a player lays a card down, he or she must add the value of the card to the running total of the discard pile.
• Play continues in this manner until a player is forced to go over 99, which means that player is out of the game.
• Value of each card:
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  o 6: add 6
  o 7: skip turn
  o 8: add 8
  o 9: add 9
  o 10: subtract 10
  o Jack: add 10
  o Queen: add 10
  o King: sum immediately goes to 99

WINNING
The last player left at the end of the game wins!
Simplifying Fractions Bingo

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<td>Subject/Course</td>
<td>Grade</td>
<td>Math</td>
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</table>

Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.4.NF.A.1: Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Learning Objectives

- At the end of the activity, each student will be able to describe why a fraction is equivalent to another fraction.

Academic Language

- Describe
- Fraction
- Equivalent

List Resources

- [https://www.teacherspayteachers.com/Product/Simplifying-Fractions-Bingo-FREE-428577](https://www.teacherspayteachers.com/Product/Simplifying-Fractions-Bingo-FREE-428577)
- Fraction Bingo Gameboard
- Fraction Answers
- Calling Cards- Fraction Bingo Problems/ Fraction Answers (double sided)
- Colored chips
- Pencils
- Candy prizes

THE ACTIVITY PROCEDURES

- Give each player a blank Fraction Bingo Gameboard.
- Display the Fraction Answers for students to record randomly on their boards.
- The caller draws out and calls a Fraction Bingo Problem from the Calling Cards.
- Players simplify the fraction until it is in lowest terms and mark the equivalent fraction on their boards.
- Continue playing until a player has a row, column, or diagonal covered and announces, ‘Bingo!’
- The caller should check the answer to be sure they are correct before declaring a winner.
Simplifying Fractions Bingo Directions

For 2+ players • Ages 4\textsuperscript{th} grade to adult

OBJECT
To get a row, column, or diagonal covered on the Fraction Bingo Gameboard.

MATERIALS
• Fraction Bingo Gameboard
• Fraction Answers
• Calling Cards
• Colored chips
• Pencils

SETUP
Each player gets a blank Fraction Bingo Gameboard. Each player uses the Fraction Answers page to fill in the answers randomly on their board.

GAMEPLAY
• The caller draws and announces a Fraction Bingo Problem from the Calling Cards.
• Players simplify the fraction until it is in lowest terms and mark the equivalent fraction on their boards.
• Continue playing until a player has a row, column, or diagonal covered and announces, ‘Bingo!’
  o The caller should check the answer to be sure they are correct before declaring a winner.

WINNING
Any player to get a row, column, or diagonal covered on the Fraction Bingo Gameboard wins!
Island Conquer - Area & Perimeter

Your Name

Date 4/9/15

Subject/Course Math

Grade 4th

Standards for Mathematical Content and Standards for Mathematical Practice

• CCSS.MATH.CONTENT.4.MD.A.3: Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Learning Objectives

• At the end of the activity, each student will be able to utilize the area or perimeter formula for rectangles.

Academic Language

• Utilize
• Area
• Perimeter
• Formula
• Rectangles

List Resources

• https://www.teacherspayteachers.com/Product/FREE-Island-Conquer-Area-and-Perimeter-223684
• Island Conquer Game Board
• 2 Colored pencils
• Coordinate Cards

THE ACTIVITY PROCEDURES

• Area Directions
  o Each player chooses one color to use on the game board. Color the key at the top of the board accordingly.
  o Stack the Coordinate Cards face down near the game board.
  o Player 1 draws out a card and plots the four points according to the coordinates on the card. Player 1 uses his or her colored pencil to connect the points and form a rectangle or square. He or she then calculate the area of the figure, writes that number inside, and colors the island to capture it. (Player 2 double checks Player 1’s work.)
  o Player 2 draws out another card and repeats the above step using his or her colored pencil. (Player 1 checks Player 2’s work.)
  o Players continue taking turns creating and conquering islands, finding the area of each rectangle or square.
  o At the end of the game, players add up their points by tallying the total area of their captured islands. The player with the most points becomes Island King or Queen!

• Perimeter Directions
  o Each player chooses one color to use on the game board. Color the key at the top of the board accordingly.
Stack the Coordinate Cards face down near the game board.

Player 1 draws out a card and plots the four points according to the coordinates on the card. Player 1 uses his or her colored pencil to connect the points and form a rectangle or square. He or she then finds the perimeter of the figure, writes that number inside, and colors the island to capture it. (Player 2 double checks Player 1’s work.)

Player 2 draws out another card and repeats the above step using his or her colored pencil. (Player 1 checks Player 2’s work.)

Players continue taking turns creating and conquering islands, finding the perimeter of each rectangle or square.

At the end of the game, players add up their points by tallying the total perimeters of their captured islands. The player with the most points becomes Island King or Queen!
**Island Conquer Area Directions**

For 2 players • Ages 4th grade to adult

**OBJECT**
To be the player with the most points to become Island King or Queen.

**MATERIALS**
• Island Conquer Game Board
• 2 Colored pencils
• Coordinate Cards

**SETUP**
Each player chooses one colored pencil. Then, each player should color the key at the top of the board accordingly. The Coordinate Cards should be stacked face down near the Island Conquer Game Board.

**AREA GAMEPLAY**
• Player 1 draws a card and plots the four points according to the coordinates on the card. Player 1 uses his or her colored pencil to connect the points and form a rectangle or square. He or she then calculate the area of the figure, writes that number inside, and colors the island to capture it. (Player 2 double checks Player 1’s work.)
• Player 2 draws out another card and repeats the above step using his or her colored pencil. (Player 1 checks Player 2’s work.)
• Players continue taking turns creating and conquering islands, finding the area of each rectangle or square.
• At the end of the game, players add up their points by tallying the total area of their captured islands.

**WINNING**
The player with the most points at the end of the game becomes the Island King or Queen.
Island Conquer Perimeter Directions

For 2 players • Ages 4th grade to adult

OBJECT
To be the player with the most points to become Island King or Queen.

MATERIALS
• Island Conquer Game Board
• 2 Colored pencils
• Coordinate Cards

SETUP
Each player chooses one colored pencil. Then, each player should color the key at the top of the board accordingly. The Coordinate Cards should be stacked face down near the Island Conquer Game Board.

PERIMETER GAMEPLAY
• Player 1 draws out a card and plots the four points according to the coordinates on the card. Player 1 uses his or her colored pencil to connect the points and form a rectangle or square. He or she then finds the perimeter of the figure, writes that number inside, and colors the island to capture it. (Player 2 double checks Player 1’s work.)
• Player 2 draws out another card and repeats the above step using his or her colored pencil. (Player 1 checks Player 2’s work.)
• Players continue taking turns creating and conquering islands, finding the perimeter of each rectangle or square.
• At the end of the game, players add up their points by tallying the total perimeters of their captured islands.

WINNING
The player with the most points at the end of the game becomes the Island King or Queen.
Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.4.G.A.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Learning Objectives

- At the end of the activity, each student will be able to draw points, lines, line segments, rays, angles, and perpendicular and parallel lines.

Academic Language

- Draw
- Points
- Lines
- Line segments
- Rays
- Angles
- Perpendicular Lines
- Parallel Lines

List Resources

- https://www.teacherspayteachers.com/Product/Gr-4-6-Free-Pictionary-type-Cards-with-Geometry-Terms-578529
- Geometry Pictionary Cards
- Scrap paper
- Pencils

THE ACTIVITY PROCEDURES

- Divide the players into two teams.
- Place the cards face down in a stack between the teams.
- Decide upon a time limit – 2 minutes?
- One player from one team picks a card and draws it in front of his or her group until someone gets it. Then, the next person picks a card and continues play until time is up.
- The other team repeats the step above.
- Play continues until all the cards are drawn.
- The team with the most cards at the end of play wins!

- You can’t:
  - Speak or gesture while drawing
  - Draw letters or numbers
  - Choose one player to draw the pictures the whole game. Players must take turns drawing.
Geometry Pictionary Directions

For 2+ players • Ages 4th grade to adult

OBJECT
To be the team with the most cards at the end of the game.

MATERIALS
• Geometry Pictionary Cards
• Scrap paper
• Pencils

SETUP
Divide the players into two teams. Place the cards face down in a stack between the two teams. Decide upon a time limit—around two minutes.

GAMEPLAY
• One player from one team picks a card and draws it in front of his or her group until someone gets it. Then, the next person on the same team picks a card and continues play until time is up.
• The other team repeats the step above.
• Play continues until all the cards are drawn.

• While playing Geometry Pictionary you cannot:
  o Speak or gesture while drawing
  o Draw letters or numbers
  o Choose one player to draw the pictures the whole game. Players must take turns drawing.

WINNING
The team with the most cards at the end of the game wins!
# Football Math

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<thead>
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<tr>
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<td>Math</td>
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<tr>
<td><strong>Grade</strong></td>
<td>5th</td>
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</tbody>
</table>

## Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.5.OA.A.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

## Learning Objectives

- At the end of the activity, each student will be able to utilize parentheses to evaluate numerical expressions.

## Academic Language

- Utilize
- Parentheses
- Evaluate
- Numerical expressions

## List Resources

- Football Math Cards
- Scratch paper
- Pencils
- Possible Solutions handout

## THE ACTIVITY PROCEDURES

- Shuffle the cards and place them face down in the middle of the playing area.
- Players take turns turning over the top card.
- Each player is to use the four numbers surrounding the football to make the red target number located in the center of the football. Hint: many cards have more than one solution!
- If a player is able to use all numbers on the card to make the target number, the player says ‘touchdown!’ The player then shares his or her solution. All numbers must be used in the solution. Each number may only be used once. If the solution is correct, the player collects the card.
- Repeat the above steps until all cards have been played.
- The player with the most cards at the end wins!
Football Math Directions

For 2+ players • Ages 5th grade to adult

OBJECT
To be the player with the most touchdowns or Football Math cards at the end of the game.

MATERIALS
• Football Math Cards
• Scratch paper
• Pencils
• Possible Solutions handout

SETUP
Shuffle the cards and place them face down in the middle of the playing area.

GAMEPLAY
• Players take turns turning over the top card.
• Each player is to use the four numbers surrounding the football to make the red target number located in the center of the football. Hint: many cards have more than one solution!
• If a player is able to use all of the numbers on the card to make the target number, the player says ‘touchdown!’ The player then shares his or her solution. All numbers must be used in the solution. Each number may only be used once. If the solution is correct, the player collects the card.
• Repeat the above steps until all cards have been played.

WINNING
The player with the most touchdowns or Football Math cards at the end of the game wins!
Comparing Decimals War

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**Standards for Mathematical Content and Standards for Mathematical Practice**

- CCSS.MATH.CONTENT.5.NBT.A.3: Read, write, and compare decimals to thousandths.

**Learning Objectives**

- At the end of the activity, each student will be able to compare decimals to the thousandth place.

**Academic Language**

- Compare
- Decimals
- Ones place
- Tenths place
- Hundredths place
- Thousandths place

**List Resources**

- [https://www.teacherspayteachers.com/Product/Comparing-Decimals-Game-Freebie-217819](https://www.teacherspayteachers.com/Product/Comparing-Decimals-Game-Freebie-217819)
- Dice (3)
- Comparing Decimals handout
- Pencils

**THE ACTIVITY PROCEDURES**

- The first player will roll the three dice. The student will use the numbers that he or she rolled to create the largest three digit number that can be made and record it on the Comparing Decimals sheet. One digit will go in the tenths place, one in the hundredths, and one in the thousandths.
- The other player will take a turn.
- Then, both students will look to see who has the greatest number. The winner will record a tally mark at the top next to Player 1 or Player 2.
- The student with the most tallies wins the game!
Comparing Decimals War Directions

For 2 players • Ages 5th grade to adult

OBJECT
To be the player with the most tallies at the end of the game.

MATERIALS
• Dice (3)
• Comparing Decimals Handout
• Pencils

SETUP
Decide which player will be player 1 and player 2.

GAMEPLAY
• The first player will roll the three dice. The student will use the numbers that he or she rolled to create the largest three digit number that can be made and record it on the Comparing Decimals sheet. One digit will go in the tenths place, one in the hundredths, and one in the thousandths.
• The other player will take a turn repeating the step above.
• Then, both students will look to see who has the greatest number. The winner will record a tally mark at the top next to Player 1 or Player 2.

WINNING
The player with the most tallies at the end of the game wins!
**Standards for Mathematical Content and Standards for Mathematical Practice**

- CCSS.MATH.CONTENT.5.NF.A.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, \( \frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12} \). (In general, \( \frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd} \).)

**Learning Objectives**

- At the end of the activity, each student will be able to add and subtract fractions with like and unlike denominators.

**Academic Language**

- Add
- Subtract
- Fractions
- Like denominators
- Unlike denominators

**List Resources**

- [https://www.teacherspayteachers.com/Store/Games-4-Gains/PreK-12-Subject-Area/Fractions/Price-Range/Free/Grade-Level/3-5](https://www.teacherspayteachers.com/Store/Games-4-Gains/PreK-12-Subject-Area/Fractions/Price-Range/Free/Grade-Level/3-5)

- 20 colored chips (10 one color, 10 a different color)
- Dice (2)
- Adding Fractions Bump Game #1
- Adding Fractions Bump Game #2
- Subtracting Fractions Bump Game #1
- Subtracting Fractions Bump Game #2

**THE ACTIVITY PROCEDURES**

- Adding Fractions Bump
  - Each player takes 10 chips of the same color.
  - Each player rolls a dice. Whoever has the highest roll goes first.
  - The first player rolls both dice. The player adds the number of both dice together. (For example, if the player rolled a 6 and a 4, the sum of both dice is 10.) The player finds the number on the chart of the game board. The player solves the sum of the fractions beside that number, and covers that sum on the game board with one of his or her colored chips.
  - If the player rolls a sum that has already been covered by the other player, the player can bump the other player’s chip off and replace it with his or her own chip.
  - If the player rolls a sum that has already been covered with his or her own chip, the player can place a second chip on top of it. When two of a player’s chips are on top
of the same number, the other player can no longer bump off that player's chips.
• If the player rolls a sum that has already been locked in by either player, the player cannot do anything. He or she must wait for the next turn.
• If the player rolls a 12, he or she must create an addition sentence whose sum is equal to the fraction on the space he or she wants to put his or her chip on. The player's addition sentence must be correct in order to place a counter on that space.
• Play continues with each player taking turns until one player has placed all 10 of his or her chips on the game board.
• The first player to place all 10 of his or her chips on the game board is the winner!

• Subtracting Fractions Bump
  • Each player takes 10 chips of the same color.
  • Each player rolls a dice. Whoever has the highest roll goes first.
  • The first player rolls both dice. The player adds the number of both dice together. (For example, if the player rolled a 6 and a 4, the sum of both dice is 10.) The player finds the number on the chart of the game board. The player solves the problem beside that number, and covers the corresponding answer on the game board with one of his or her colored chips.
  • If the player rolls a sum that has already been covered by the other player, the player can bump the other player's chip off and replace it with his or her own chip.
  • If the player rolls a sum that has already been covered with his or her own chip, the player can place a second chip on top of it. When two of a player's chips are on top of the same number, the other player can no longer bump off that player's chips.
  • If the player rolls a sum that has already been locked in by either player, the player cannot do anything. He or she must wait for the next turn.
  • If the player rolls a 12, he or she must create an addition sentence whose sum is equal to the fraction on the space he or she wants to put his or her chip on. The player's addition sentence must be correct in order to place a counter on that space.
  • Play continues with each player taking turns until one player has placed all 10 of his or her chips on the game board.
  • The first player to place all 10 of his or her chips on the game board is the winner!
Adding Fractions Bump Directions

For 2 players • Ages 5th grade to adult

OBJECT
To be the player to place all 10 colored chips on the board.

MATERIALS
• 20 Colored chips (10 of one color, 10 of a different color)
• Dice (2)
• Adding Fractions Bump Game #1
• Adding fractions Bump Game #2

SETUP
Each player takes 10 chips of the same color. Each player rolls a die. The player with the highest roll goes first.

GAMEPLAY
• The first player rolls both dice. The player adds the number of both dice together. (For example, if the player rolled a 6 and a 4, the sum of both dice is 10.) The player finds the number on the chart of the game board. The player solves the sum of the fractions beside that number, and covers that sum on the game board with one of his or her colored chips.
• If the player rolls a sum that has already been covered by the other player, the player can bump the other player's chip off and replace it with his or her own chip.
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• If the player rolls a 12, he or she must create an addition sentence whose sum is equal to the fraction on the space he or she wants to put his or her chip on. The player's addition sentence must be correct in order to place a counter on that space.
• Play continues with each player taking turns until one player has placed all 10 of his or her chips on the game board.

WINNING
The player who places all 10 of his or her colored chips on the board first wins!
Subtracting Fractions Bump Directions

For 2 players • Ages 5th grade to adult

OBJECT
To be the player to place all 10 colored chips on the board.

MATERIALS
• 20 Colored chips (10 of one color, 10 of a different color)
• Dice (2)
• Subtracting Fractions Bump Game #1
• Subtracting fractions Bump Game #2

SETUP
Each player takes 10 chips of the same color. Each player rolls a die. The player with the highest roll goes first.

GAMEPLAY
• The first player rolls both dice. The player adds the number of both dice together. (For example, if the player rolled a 6 and a 4, the sum of both dice is 10.) The player finds the number on the chart of the game board. The player solves the problem beside that number, and covers the corresponding answer on the game board with one of his or her colored chips.
• If the player rolls a sum that has already been covered by the other player, the player can bump the other player's chip off and replace it with his or her own chip.
• If the player rolls a sum that has already been covered with his or her own chip, the player can place a second chip on top of it. When two of a player's chips are on top of the same number, the other player can no longer bump off that player's chips.
• If the player rolls a sum that has already been locked in by either player, the player cannot do anything. He or she must wait for the next turn.
• If the player rolls a 12, he or she must create an addition sentence whose sum is equal to the fraction on the space he or she wants to put his or her chip on. The player's addition sentence must be correct in order to place a counter on that space.
• Play continues with each player taking turns until one player has placed all 10 of his or her chips on the game board.

WINNING
The player who places all 10 of his or her colored chips on the board first wins!
Measurement Bingo

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Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.5.MD.A.1: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Learning Objectives

- At the end of the activity, each student will be able to convert among different standard measurements.

Academic Language

- Convert
- Standard measurements

List Resources

- [https://www.teacherspayteachers.com/Product/Measurement-Bingo-Game-231024](https://www.teacherspayteachers.com/Product/Measurement-Bingo-Game-231024)
- Measurement Bingo Card
- Measurement Bingo Card Answers
- Caller Bingo Cards
- Caller Bingo Cards/ Measurement Bingo Card Answers Table
- Pencils
- Colored chips
- Candy prizes

THE ACTIVITY PROCEDURES

- Give each player a blank Measurement Bingo card.
- Display the Measurement Bingo card answers for players to record randomly on their boards.
- The caller draws out and calls a Bingo Card.
- Players mark the equivalent measurement on their boards.
- Continue playing until a player has a row, column, or diagonal covered and announces, ‘Bingo!’
- The caller should check the answer to be sure they are correct before declaring a winner.
**Measurement Bingo Directions**

For 2+ players • Ages 5th grade to adult

**OBJECT**
To get a row, column, or diagonal covered on the Measurement Bingo Card.

**MATERIALS**
- Measurement Bingo Card
- Measurement Bingo Card Answers
- Caller Bingo Cards
- Bingo Card Answers
- Pencils
- Colored chips

**SETUP**
Give each player a blank Measurement Bingo Card. Display the Measurement Bingo Card Answers for players to randomly record on their boards.

**GAMEPLAY**
- The caller draws and calls a Bingo Card.
- Players mark the equivalent measurement on their boards.
- Continue playing until a player has a row, column, or diagonal covered and announces, 'Bingo!'
- The caller should check the answer to be sure they are correct before declaring a winner.

**WINNING**
Any player to get a row, column, or diagonal covered on the Measurement Bingo card wins!
Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.5.G.A.1: Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

Learning Objectives

- At the end of the activity, each student will be able to plot a coordinate pair on a coordinate system.

Academic Language

- Plot
- Coordinate pair
- Coordinate system

List Resources

- 10 x 10 graph paper
- Pencils

THE ACTIVITY PROCEDURES

- The game is played almost like the old, familiar Tic-Tac-Toe except that:
  - The X’s and O’s are put on the line intersections instead of in spaces.
  - The board is larger.
  - The goal is to get four X’s or four O’s in a row.
  - The places where X’s and O’s are put must be given according to their ordered pair names.
- Players take turns naming the points for the X and O. The points must be named by their ordered pair designations.
- The goal is to get four X’s or four O’s in a row.
Coordinate Tic-Tac-Toe Directions

For 2 players • Ages 5th grade to adult

OBJECT
To be the player to get four X’s or four O’s in a row first.

MATERIALS
• 10 x 10 Grid paper
• Pencils

SETUP
Decide which player will be the X’s and which player will be the O’s.

GAMEPLAY
• The game is played almost like the old, familiar Tic-Tac-Toe except that:
  o The X’s and O’s are put on the line intersections instead of in spaces.
  o The board is larger.
  o The goal is to get four X’s or four O’s in a row.
  o The places where X’s and O’s are put must be given according to their ordered pair names.
• Players take turns naming the points for the X and O. The points must be named by their ordered pair designations.

WINNING
The first player to get four X’s or four O’s in a row on the coordinate system first wins.
### Three Bean Salads

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<td>Math</td>
<td>6th</td>
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#### Standards for Mathematical Content and Standards for Mathematical Practice
- **CCSS.MATH.CONTENT.6.RP.A.1**: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”*

#### Learning Objectives
- At the end of the activity, each student will be able to describe a ratio relationship.

#### Academic Language
- Describe
- Ratio

#### List Resources
- Red beans
- Lima beans
- Black-eyed peas
- Paper cups
- Three Bean Salads handout

#### THE ACTIVITY PROCEDURES
- All three types of beans go into each salad.
- Players should be encouraged to guess and adjust as they work. Use the beans to solve the problems.
- For each salad, determine how many of each of the three types of beans are needed.
Three Bean Salad Directions

For 1+ players • Ages 6th grade to adult

OBJECT
To find the number of each of the three bean types needed in each salad.

MATERIALS
• Red beans
• Lima beans
• Black-eyed peas
• Paper cups
• Three Bean Salads handout

SETUP
Put a small portion of each type of bean into its own cup.

GAMEPLAY
• All three types of beans go into each salad.
• Players should be encouraged to guess and adjust as they work. Use the beans to solve the problems.
• For each salad, determine how many of each of the three types of beans is needed.
**Integer Insanity**

<table>
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<tr>
<th>Your Name</th>
<th>Date</th>
<th>4/9/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject/Course</td>
<td>Grade</td>
<td>6th</td>
</tr>
</tbody>
</table>

**Standards for Mathematical Content and Standards for Mathematical Practice**

- CCSS.MATH.CONTENT.6.NS.C.5: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

**Learning Objectives**

- At the end of the activity, each student will be able to divide multi-digit numbers.
- At the end of the activity, each student will be able to describe how positive and negative numbers are used.

**Academic Language**

- Divide
- Multi-digit numbers
- Describe
- Positive numbers
- Negative numbers

**List Resources**

- https://www.teacherspayteachers.com/Product/Integer-Insanity-683404
- Integer Insanity Cards
- Integer Insanity Score Sheet
- Scrap paper
- Pencils

**THE ACTIVITY PROCEDURES**

- The person whose name begins with the letter closest to ‘z’ goes first.
- Stack the cards face down.
- The first player will choose a card and solve the problem.
- Decide which category your answer best fits and enter the point for that category in the correct column.
- If an answer doesn’t fit in a category or that category has already been taken, the player can choose to use the ‘chance’ category (similar to a free space in bingo). If chance is not available because the player has used it on a previous turn, then the player must put a 0 in a category of you’re their choice.
- If after 10 turns a player has all of the categories filled in and haven’t entered any zeroes, add 10 bonus points.
- The winner is the person with the most points after 10 turns!
- There will be four unused cards.
Integer Insanity Directions

For 2 players • Ages 6th grade to adult

OBJECT
To be the player with the most points after 10 turns.

MATERIALS
• Integer Insanity Cards
• Integer Insanity Score Sheet
• Scrap paper
• Pencils

SETUP
The person whose name begins with the letter closest to 'z' goes first.
Stack the cards face down.

GAMEPLAY
• The first player will choose a card and solve the problem.
• Decide which category your answer best fits and enter the point for that category in the correct column.
• If an answer doesn’t fit in a category or that category has already been taken, the player can choose to use the ‘chance’ category (similar to a free space in bingo). If chance is not available because the player has used it on a previous turn, then the player must put a 0 in a category of you’re their choice.
• If after 10 turns a player has all of the categories filled in and haven’t entered any zeroes, add 10 bonus points.
• There will be four unused cards.

WINNING
The player with the most points after 10 turns wins!
Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.6.EE.A.2: Write, read, and evaluate expressions in which letters stand for numbers.

Learning Objectives

- At the end of the activity, each student will be able to evaluate expressions in which x stands for a number.

Academic Language

- Evaluate
- Expressions
- X

List Resources

- [https://www.teacherspayteachers.com/Product/Math-Flips-Flip-for-Expressions-1050335](https://www.teacherspayteachers.com/Product/Math-Flips-Flip-for-Expressions-1050335)
- 2 chips (1 of one color, 1 of a different color)
- Flip for Expressions 1 Board- no integers
- Flip for Expressions 2 Board- integers
- Flip for Expressions Score Sheet
- Math Flip – Flip for Expressions 1 Key
- Math Flip – Flip for Expressions 2 Key
- Pencils

THE ACTIVITY PROCEDURES

- The player will flip their chip onto the game board.
- Solve the problem where the chip landed. A player’s chip will most likely not land completely in a square. Go with the square that the chip mostly covers.
- If a player is correct, initial the square and record the points (the number in the bottom right corner of the square in orange).
- Then it is the other player’s turn.
- Play continues for 5 rounds.
- Add up your score. The person with the highest score wins!
Math Flip Directions

For 2 players • Ages 6th grade to adult

OBJECT
To be the player with the highest score at the end of the game.

MATERIALS
• 2 Colored chips (1 of one color, 1 of a different color)
• Flip for Expressions 1 Board- no integers
• Flip for Expressions 2 Board- integers
• Flip for Expressions Score Sheet
• Math Flip – Flip for Expressions 1 Key
• Math Flip – Flip for Expressions 2 Key
• Pencils

SETUP
Each player chooses a colored chip.

GAMEPLAY
• The player will flip their chip onto the game board.
• Solve the problem where the chip landed. A player’s chip will most likely not land completely in a square. Go with the square that the chip mostly covers.
• If a player is correct, initial the square and record the points (the number in the bottom right corner of the square in orange).
• Then it is the other player’s turn.
• Play continues for 5 rounds.
• Add up your score.

WINNING
The player with the highest score at the end of the game wins!
<table>
<thead>
<tr>
<th>Your Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4/9/15</td>
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</table>

<table>
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<tr>
<th>Subject/Course</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>Math</td>
<td>6th</td>
</tr>
</tbody>
</table>

**Standards for Mathematical Content and Standards for Mathematical Practice**

- CCSS.MATH.CONTENT.6.G.A.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

**Learning Objectives**

- At the end of the activity, each student will be able to calculate the area of triangles, rectangles parallelograms, and trapezoids.

**Academic Language**

- Calculate
- Area
- Triangles
- Rectangles
- Parallelograms
- Trapezoids

**List Resources**

- Math Bingo Boards
- Colored chips
- Math Bingo Text
- Pencils

**THE ACTIVITY PROCEDURES**

- Distribute one Math Bingo Board to each player. Players should fill in the blank spaces randomly with numbers 1-60.
- The caller will choose numbers at random from the Math Bingo Text. Read the text beside each number, but don’t read the actual number itself aloud. If a student has the number on his/her card, the student should mark the square with a colored chip.
- Standard Bingo rules apply. A column, row, diagonal, or four corners is a win!
Area Bingo Directions

For 2+ players • Ages 6<sup>th</sup> grade to adult

OBJECT
To get a row, column, diagonal, or four corners covered on the Math Bingo Board.

MATERIALS
• Math Bingo Boards
• Colors chips
• Math Bingo Text
• Pencils

SETUP
Distribute one Math Bingo Board to each player. Players should fill in the blank spaces randomly with numbers 1-60.

GAMEPLAY
• The caller will choose numbers at random from the Math Bingo Text. Read the text beside each number, but don’t read the actual number itself aloud. If a student has the number on his/her card, the student should mark the square with a colored chip.
• Standard Bingo rules apply. A column, row, diagonal, or four corners is a win!

WINNING
Any player to get a row, column, diagonal, or four corners covered on the Math Bingo Board wins!
Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.6.SP.A.1: Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students’ ages.

Learning Objectives

- At the end of the activity, each student will be able to identify statistical questions.

Academic Language

- Identify
- Statistical Questions

List Resources

- [http://illuminations.nctm.org/Lesson.aspx?id=956](http://illuminations.nctm.org/Lesson.aspx?id=956)
- SKUNK Game Board
- Dice (2)
- Pencils

**THE ACTIVITY PROCEDURES**

- Each letter of SKUNK represents a different round of the game. Play begins with the ‘S’ column and continues through the ‘K’ column.
- At the beginning of each round, every player stands. Then, a pair of dice is rolled. Everyone playing uses that roll of the dice. Unlike other games, players do not roll the dice for just themselves.
- A player gets the total for the dice and records in in his or her column, unless a one comes up.
- If one comes up, play is over for that round and all the player’s points in that column are wiped out.
- If double ones come up, all points accumulated in prior columns are wiped out as well.
- If a one does not occur, the player may choose to either try for more points on the next roll (remain standing) or to stop and keep what he or she has accumulated (sit down).
- After each roll, players may choose either to remain standing or sit down. Those who remain standing get the results of the next dice roll. Those who sit down keep the score they have accumulated for that round regardless of future dice rolls.
- Once a person sits down, that person may not stand up again until the beginning of the next round.
SKUNK Directions

For 2+ players • Ages 6th grade to adult

OBJECT
To be the player to accumulate the most points after five rounds.

MATERIALS
• SKUNK Game Board
• Dice (2)
• Pencils

GAMEPLAY
• Each letter of SKUNK represents a different round of the game. Play begins with the 'S' column and continues through the 'K' column.
• At the beginning of each round, every player stands. Then, a pair of dice is rolled. Everyone playing uses that roll of the dice. Unlike other games, players do not roll the dice for just themselves.
• A player gets the total for the dice and records in in his or her column, unless a one comes up.
• If one comes up, play is over for that round and all the player’s points in that column are wiped out.
• If double ones come up, all points accumulated in prior columns are wiped out as well.
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• After each roll, players may choose either to remain standing or sit down. Those who remain standing get the results of the next dice roll. Those who sit down keep the score they have accumulated for that round regardless of future dice rolls.
• Once a person sits down, that person may not stand up again until the beginning of the next round.

WINNING
The player who accumulates the most points after five rounds.
Standards for Mathematical Content and Standards for Mathematical Practice

- CCSS.MATH.CONTENT.3.MD.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.
- CCSS.MATH.CONTENT.4.MD.B.4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.
- CCSS.MATH.CONTENT.5.MD.B.2: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Learning Objectives

- At the end of the activity, each student will be able to create a line plot.

Academic Language

- Create
- Line plot

List Resources

- Line plot
- Stickers

THE ACTIVITY PROCEDURES

- As students arrive at the family math night, they will place a sticker on the line plot for their class. This will help to keep track of attendance overall, for each grade, and for each class while allowing students the chance to participate in creating a line plot.
<table>
<thead>
<tr>
<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>• At the end of the activity, each student will be able to estimate the number of base-10 cubes in a jar.</td>
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<table>
<thead>
<tr>
<th>Academic Language</th>
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</thead>
<tbody>
<tr>
<td>• Estimate</td>
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<tr>
<td>• Base-10 cubes</td>
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<tr>
<th>List Resources</th>
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<tbody>
<tr>
<td>• 1 jar</td>
</tr>
<tr>
<td>• Base-10 cubes</td>
</tr>
<tr>
<td>• Estimation slips</td>
</tr>
</tbody>
</table>

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<tr>
<th>THE ACTIVITY PROCEDURES</th>
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<tbody>
<tr>
<td>• Students and parents will estimate the number of items in a jar. They will write this estimate down on a slip of paper with their name on it. At the end of the family math night, the person with the closest estimate for each jar will win a prize.</td>
</tr>
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Family Math Night Sign-In

Fostoria Intermediate Elementary
Thursday, April 9, 2015
5:00 – 7:30 P.M.

<table>
<thead>
<tr>
<th>Student Name(s)</th>
<th>Teacher(s)</th>
<th>Total # people</th>
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</tbody>
</table>
Family Math Night Schedule

Fostoria Intermediate Elementary • Thursday, April 9, 2015 • 5:00 - 7:30 P.M.

Grade 3- Library
Grade 4- Room 219 (Sharkey)
Grade 5 & Grade 6- Room 224 (Stevenson)

5:00-5:40 P.M. Introductions and dinner in the cafeteria
5:40-6:00 P.M. Game 1
6:00-6:20 P.M. Game 2
6:20-6:40 P.M. Game 3
6:40-7:00 P.M. Game 4
7:00-7:20 P.M. Game 5
7:20-7:30 P.M. Family Math Night Parent Survey
Helping Your Child in the Area of Mathematics

Support positive attitudes towards mathematics

- Let your child know that everyone can be successful in mathematics. This can be done by...
- ...encouraging your child to be persistent in working through problems; success will build confidence.
- Avoid negative comments about math such as, “I was never good at math.”
- Praise effort not intelligence. Use words like *I like how hard you are trying.* Avoid saying things like *you are smart.*

Be an active participant in your child’s learning

- Read books to your child that involve math and talk about the math as you read.
- Relate math to real-life experiences so your child can see how math is useful.
- Complete puzzles and play board and computer games that involve logical thinking, strategizing, and reasoning.
- Involve your child in daily activities that require the use of math such as weighing objects at the grocery store, measuring ingredients for a recipe, and estimating the amount of time it will take to complete a task.
- Problem-solve out loud so your child can learn how think through the steps necessary to solve a problem.

Create an appropriate learning environment

- Provide materials and manipulatives that promote and support mathematics such as pencils, paper, rulers, tape measures, counters, protractors, calculator, measuring spoons/cups, analog clock, graph paper, thermometer, etc.
- Create a “homework spot” in a well-lit spot, complete with sharpened pencils and erasers, where your child can study and do homework.

Promote critical thinking and problem-solving skills

- As your child works on math assignments, ask higher order thinking questions such as *How can you prove that? What would happen if...? Does that make sense? Can you predict what would happen next? How does this relate to...?*
- Encourage your child to solve problems a variety of ways: Guess and check, draw a picture, make a list, solve a similar problem, look for a pattern, work backwards, use manipulatives, simulate the problem, make a list, etc.

Show interest in what your child is doing and learning at school

- Make it a habit to ask your child to tell you about what they learned about math in school that day. Follow up with interesting questions to let them know what they are learning is important to you.
- Participate in parent-teacher conferences, Open House nights, Family Math Night and other educational and community-building events.

For more ideas on helping your child in math, visit our Family Math Night Facebook page or website at www.FamilyMathNight.com.
Family Math Night Website & App List

Websites

AplusMath: http://www.aplusmath.com

Arcademic Skill Builders: http://www.arcademics.com

Funbrain: http://www.funbrain.com

iMathGame: http://imathgame.com

IXL: http://www.ixl.com/math/

Khan Academy: https://www.khanacademy.org/math

KS2 Bitesize: http://www.bbc.co.uk/bitesize/ks2/maths/


Apps

Awesome Arithmetic

Counting Coins and Bills

Fun Math Tricks Lite

Kid Math Game

Let's Do The Math

Mathmateer

Motion Math: Wings

Slice It!

Wuzzit Trouble

2048
Fostoria Intermediate Family Math Night Survey

1. Do you think the Family Math Night was beneficial for your family?
   - yes
   - somewhat
   - no

2. Were the games and activities at the stations interesting?
   - yes
   - somewhat
   - no

3. Did the activities help you and your child in understanding different math concepts?
   - yes
   - somewhat
   - no

4. Will you use these math activities at home to help your child understand the math he or she is being taught at school?
   - yes
   - somewhat
   - no

5. Would you attend another event like this one?
   - yes
   - somewhat
   - no

6. Do you have any suggestions or comments on how we could improve the next Family Math Night?

   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
Introduction
Third Grade
Fourth Grade
Fifth and Sixth Grade
A Depiction and Reflection: Fostoria Intermediate Elementary School Family Math Night

The event I had been planning for months had finally come. I had worked every night the past several weeks creating, cutting, and copying the materials to prepare for my family math night and Fostoria Intermediate Elementary School. It was Thursday, April 9, 2015, and I was ready. Before school, during planning, and after school I worked with several helpers to set up the rooms and lay out the materials for the family math night.

Just before 5:00 P.M., families began to arrive. However, at about 5:05 P.M., there was a tornado warning! Everyone had to go into the locker room at the school to remain safe. Thankfully the warning did not last long. By 5:25 P.M., we were all able to go back out to the cafeteria for dinner. While the night may have started out a little rocky, it continued very smoothly until the end. Several more families joined us after the tornado warning, adding to an already decent turnout. After signing in, families would eat shredded chicken sandwiches, potato salad, chips, and a cookie for dinner in the cafeteria. Yum! Also in the cafeteria, families were welcome to visit the favorite color line plot and the estimation station. At the favorite color line plot, one was to put a sticker above their favorite color on the line plot poster. At the estimation station, one was to estimate the number of cubes in the jar. The winner would win the dice game “Farkle”!

As families were finishing up dinner and the cafeteria activities, Mrs. Matz, the principal, welcomed families to the family math night and introduced me. I went on to discuss why I had planned this night, the purpose of the night, and how the night would run. Shortly after, families began making their ways to the room in which they were assigned. Throughout the school building there was a third grade room, a fourth grade room, and a fifth and sixth grade room. In each room, there were five games the families would be able to play for about 15 minutes each.
Take home materials were also provided for each game so the families could play these mathematical games at home as well.

As families settled into their rooms, they began playing the games with the help of volunteer classroom teachers. I was not stationed at one specific room, but rather circulated among the different rooms throughout the night. I enjoyed moving from room to room, visiting with different families at different games. It was interesting to see the engagement of the students playing these math games in comparison to their engagement in math class. All of the students seemed to be interested and having fun, all the while thinking mathematically, problem solving, and thinking critically. Everything about the night rolled smoothly after the tornado warning, which I had forgot about throughout the night as I was so engaged in the mathematical thinking occurring as well.

While the night may not have started out how I planned, it did turn out successfully. I believe my goals were accomplished throughout the night. Families engaged freely in mathematical thinking, problem solving, and critical thinking together unrelated to school or homework through fun, challenging, and educational math games. While I have no way of gauging whether or not the night boosted students mathematical skills or engagement, I believe if the students play the games they took home, then it would have. According to the parent survey filled out at the end of the night, all parents thought the family math night was beneficial for their family. In addition, most parents thought the games and activities were interesting, the activities helped them and their child in understanding different math concepts, they would use these activities at home, and that they would attend another event like this one. In conclusion, I felt my family math night was a success. While the family math night was a large task to undertake as one person, I now feel more capable of planning and holding another family night!