



LegoLand Construction: *Building a strong foundation of multiplication and measurement*

by Miesha Gadsden, 2015 CTI Fellow
J.H. Gunn Elementary School

This curriculum unit is recommended for:
(2nd/3rd/4th grade students for math)

Keywords: multiplication, arrays, communities

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: Math is all around us and we can certainly integrate it with science and social studies. I would like this unit to explore the hidden mysteries of math and give students a foundation they need for problem solving in a fun and creative way. What are the hidden mysteries? *Finding math around us in non-traditional ways.* What are fun and creative ways? *Teaching deeper through the use of manipulatives, food, games, technology and more!* Our 21st learners need knowledge beyond what our textbook can sometimes offer to us. They need to know how they can **apply** the information they learned in real life situations. Finding the correct answer to 4 X 6 is great, but understanding the PROCESS is even better. We will first approach this unit with a challenge: *The engineers at Lego Land would like to host a ceremony to unveil the new layout for their LegoLand City project. They need your help to design a city that will accommodate a large crowd and give the tourists a variety of attractions and activities.* This unit will use measurement, addition, subtraction, multiplication and division for math focus topics. To integrate with writing and social studies, this unit will explore the components of cities and communities and how they change. I want students to come away from this unit with the understanding that math is all around them and that they can always use their MIND to conquer any fears they may have of MATH.

I plan to teach this unit during the coming year in to 22 students in math and integration through social studies.

I give permission for Charlotte Teachers Institute to publish my curriculum unit in print and online. I understand that I will be credited as the author of my work.

LegoLand Construction: *Building a strong foundation of multiplication and measurement*

Miesha Gadsden

Introduction

The Discovery

As an educator, I have discovered that many students and teachers suffer from a fast spreading case of “Math-phobia.” Fractions....Ahhh! Multiplication.... What?!! Subtraction Fast Facts..... Oh my!! What can we do to solve this problem? Why is it that when the word “math” is spoken, hints of fear, anxiety and confusion invade our brains and cause us to turn away? Is it the computation part of math, the problem solving part of math or a combination of all math components?

The Purpose

I would like this unit to explore the hidden mysteries of math and give students a foundation they need for problem solving in a fun and creative way. What are the hidden mysteries? *Finding math around us in non-traditional ways.* What are fun and creative ways? *Teaching deeper through the use of manipulatives, food, games, technology and more!* Our 21st learners need knowledge beyond what our textbook can sometimes offer to us. They need to know how they can **apply** the information they learned in real life situations.

Finding the correct answer to 4×6 is great, but understanding the PROCESS is even better. When students know how to decompose problems, explain their thinking and model their solution in multiple ways, they are able to tackle problems they never knew they could solve.

The Ideas

Math is all around us and we can easily integrate it with science and social studies. We will first approach this unit with a challenge: *The engineers at Lego Land would like to host a ceremony to unveil the new layout for their LegoLand City project. They need your help to design a city that will accommodate a large crowd and give the tourists a variety of attractions and activities.* From this task challenge, we will model with mathematics using cubes, Legos and tiles. This hands-on approach allows students to tap into their creative side as well as problem-solve to find the most appropriate building dimensions for their community. Students will use multiplication foundations of arrays design their buildings. They will use the “studs” on Legos to determine the dimensions on their building. For example, a Lego that has 2 rows and 3 studs going across is a 2×3 array. They will also use measurement foundations to measure the perimeter of their buildings. Once students create and measure their buildings they will construct viable arguments to PROVE whether their building meets city regulations. Some city regulations may include: Must be an even number, must have 3 as a factor, etc. Students will also develop their own story problems for their peers to solve related to their community design. We will culminate our unit by creating a Lego Proof Party. Students will have opportunities to prove why their building design should be considered for the next new city and how they used their mind to problem solve. This unit will use measurement, addition, subtraction, multiplication and division for math focus topics. To integrate with writing and social studies, this unit will explore the components

of cities and communities. How can we find the location of specific places within a community? For example, if I want to find the location of an elementary school, will I need to travel north, south, east or west? Using their Lego Land designs as a guide, students will be able to determine directions and measure the distance between two locations. Students will utilize their writing skills by writing directions for a tourist so they can find specific locations within the community. Students will use creativity to explain special features about their community and what it has to offer. What will draw tourists and people to their community? Most importantly, I want students to come away from this unit with the understanding that math is all around them and that they can always use their MIND to conquer any fears they may have of MATH.

Demographics

J.H Gunn Elementary School is a Title 1 public school serving students K-5. The school itself has great history as it once began as four-room school frame called Clear Creek Colored Union High School in 1923. It has evolved through the years with changes in principals, students and building structure, but still retains the original gym as part of its rich history. The school has a population of 719 students, with 86% of students who qualify for free and reduced lunch. Within our subgroups our student background is 49% African American, 33% Hispanic, 14% White and 4% Asian.

Our principal firmly believes that quality instruction and uninterrupted instructional time are the keys to building student success. Our school motto, "Where Children Come First!" encourages the academic, physical, and social development of every student.

Our school serves students with physical, emotional and mental special needs as part of our Inclusion Program. Students also have opportunities for enrichment through our Talent and Development Program, English as a Second Language Program, Girls on the Run, Student Government, Basketball and Cheerleading. This school has been an integral part of our community and school system for more than 80 years.

I am a 3rd grade teacher at J.H. Gunn and have also taught Kindergarten and 2nd grade. I teach a wonderful group of students who come from various background and are on diverse academic levels. Some students come to me with very little home support, while others have support from mothers, fathers, aunts, uncles, etc. Some students come to third grade already reading on grade level, while others come in reading on grade levels that are 1-2 years behind. I collaborate with my fellow 3rd grade teammates as well as staff to create lessons that meet the needs of all my students. I use professional development such as Discovery Education training, Investigations Math Training and Common Core training to enhance knowledge and growth in my classroom. Discovery Education training was a huge support in finding science and social studies videos correlated to Common Core Standards. Common Core Standards are new to the state of North Carolina. Therefore extensive training has been offered to give teachers a better understanding of how they can prepare students to be global learners.

Our PTO involvement is very high as parents volunteer both their time and monetary gifts. This year we were fortunate to receive 2 additional SMART boards for classrooms, which aid in

technology and preparing our students for the 21st century. Currently each 3rd, 4th and 5th grade classroom has SMART boards installed in its classroom and the goal for PTO is to have each classroom equipped with this essential resource.

J.H. Gunn also initiated a Gardening Project with the help of our PTO. Students have an opportunity to plant, harvest and grow crops such as green beans, onions, lettuce, spinach and much more. Once students harvest the vegetables, they are taken to the Second Harvest Food Bank to give to those in need. What a great way to use hands-on learning and caring hearts to better the community! Our school is successful because we have a strong community and everyone believes in working together. This unity did not happen overnight. It required people from the past and leaders in the community joining their ideas together to plan for a successful future. This type of unity is important to pass on to students so that they understand their essential role in shaping our history.

Mathematical Content Objectives

Common Core Standards

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

This unit will mainly focus on Mathematical practice 1 and 4. By making sense of problems, students will be presented with a challenge question/task to determine their best strategy for solving the problem.

Numbers and Operations Standards for Grade 3

Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly



sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division (Core Standards Grade 3). With this standard, students will design array models for their LegoLand Construction City. They will sketch the array in their math journals and write the corresponding equations beside them. Then they will use their sketch model to construct a representation using cubes, tiles or Lego blocks.

Background Knowledge/ Helpful Hints

Before starting this unit, there are several questions teachers must ask themselves about how they learned math growing up and how math is taught now. If you are someone who had math fears growing up in the classroom, what were some of the challenges you faced? Reflecting on our challenges will help us understand how our students learn math and shape their viewpoint about math. One way to get a glimpse of student thoughts is by having students take a Math Survey. Below are suggested survey questions that can be used at the beginning of the year. The complete survey can be found in the Appendix ([Appendix 2](#)).

1. Math is fun.
2. I like to do math in my head.
3. Math is confusing.
4. My favorite part about math is _____.
5. My least favorite part about math is _____.

Array Models

Another helpful component before starting this unit is having strong background knowledge of Array models. Rectangular array models and dot array models provide great visual aids when teaching multiplication. For example, when finding 4×6 , mathematicians can think of repeated addition and build their model to match the addition representation.



An equivalent area model can be used with square units. By using square units, the array would show an area of four units in height and 6 base units across. 4×6 . In addition to arrays, there are properties of math that need to be addressed. *Multiplication has certain fundamental properties that are of great importance in arithmetic. The Commutative Property of Multiplication states that changing the order in which two numbers are multiplied does not change the product. That is, for all numbers a and b , $a \times b = b \times a$* (Teaching Models Grade 3 n.d.)

The distributive property is also another key component to multiplication background. This property relates the operations of multiplication and addition. It guarantees that multiplication and addition are compatible. The term “distributive” results from distributing the factor outside the parentheses over the numbers inside the parentheses. In the identity $3(4 + 5) = 3(4) + 3(5)$, the 3 is “distributed” over the 4 and the 5.

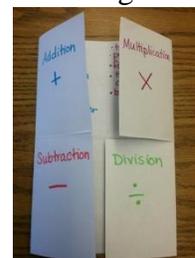
Place Value

In order for students to understand the properties of math, array models and multiplication basics, they need to have a firm foundation of place value. Place value is the overarching concept that ties all math concepts together. Place value is the structure and sequence of our base 10 number system. Place value involves more than just breaking numbers apart into 1’s, 10’s and 100’s. It involves relating it to other numbers in our number system. The Investigations Math Program lays out 5 essential questions to ask when teaching place value relating to other numbers:

- Where is the number in the number system? (Is it bigger than 10, bigger than 50, bigger than 100?)
- How can the number be pulled apart into additive components that are easy to work with? (For one problem, it might be convenient to pull 126 apart into 100 and 25 and 1; for another problem, it might be convenient to think of it as 120 and 6.)
- What are the factors of the number? (What numbers can you count by to reach the number exactly?)
- What are the multiples of the number? (What happens when the number is doubled or multiplied by 10 or by 100?)
- What is the relationship of the number to important numbers in our number system, such as multiples of 10, 25, or 100 (*How do students build an understanding of place value?*)

Vocabulary

Throughout this unit students will have exposure to vocabulary terms they will need working with place value, multiplication, measurement and operations. They will organize their vocabulary in their math notebooks by creating math foldables. This tool is a great interactive reference for any subject because it allows students to build on their previous knowledge as they learn new information throughout the unit.



Ken Ken Puzzles

Ken Ken puzzles are puzzles that combine logic, perseverance and basic arithmetic skills. I had an opportunity to try Ken Ken puzzles for the first time and immediately became hooked. My drive to figure out the missing number or missing piece really pushed me to complete each puzzle. My hope is that students will also see Ken Ken puzzles as a challenge and use their perseverance to push through each puzzle using background knowledge of basic arithmetic. The puzzles range in difficulty from very simple to very difficult. Each puzzle is divided into a

perfect square grid. This is a great opportunity to relate Ken Ken puzzles to arrays. How many rows are shown on this grid? How many columns? Within each Ken Ken puzzle, there are “cages” which are denoted using heavy black lines. In the upper left hand corner, there are clues that consist of a number and/or an arithmetic operation.

This is an example of a 3X3 array. There are three rows and three columns. Therefore, the only numbers that may be used in this array are 1,2 or 3.

This is an example of a 4X4 array. There are four rows and four columns. Therefore, the only numbers that may be used in this array are 1,2,3 or 4.

To challenge students, you can modify the arithmetic used in each puzzle. To start out with, for 2nd-3rd grade students, using a 3X3 grid or 4X4 grid is a good starting place. Model the Ken Ken puzzles by challenging students with the multiplication so they know where the unit is headed. Most students will struggle with this concept at first and that is great! The purpose is two-fold and it also teaches students to persevere when presented with a challenging problem. One of the great techniques I learned in Dr. Reiter’s class was starting with “the end in mind.” He always posed a problem for our seminar session that seemed out of our grasp to get our minds thinking. I call this the umbrella problem. What was the big idea or concept he wanted us to learn? Then he gradually worked backwards, scaffolding and facilitating as we went along to help us prove and explain the “umbrella problem.” This strategy is also a helpful way to teach students in our classroom. We want to find that middle playing field that will challenge our students just enough to become problem solvers, but not frustrate them to the point of defeat. ⁱ

Strategies

The anticipated timeline for this unit is 6-8 weeks (See Unit Overview Appendix____). The first week will be spent on discovering the basics of our number system. *What is a number/integer? What is addition? What is Multiplication? How are they related?* The second week will be on how we use place value in everything we do. The next 3-5 weeks will be spent on learning foundations of multiplication and solving problems with multiplication. We will use manipulatives such as cubes, tiles and Legos, area models and arrays. The final 2 weeks will be spent on individual and group projects, ending with the culminating activity of building the model city for LegoLand designs.

I would like to arrange students in a variety of ways from independent reflection to small group jigsaw. When students work independently on a new word problem or equation, I would like them to choose an area of the classroom they feel they work best and use math tools to help them solve their problems. The math tools need to be easily accessible in tubs or containers. This helps students explain their thinking and solve problems in multiple ways. Once students have an opportunity to work on their multiplication problems independently, I would also like students to work with partners to switch roles and compare strategies.

Jigsaw

With small group jigsaw, I would like students to work together to create their LegoLand math models. Small group jigsaw gives students an opportunity to bounce ideas back and forth off each other as well as teach others their strategies.

Interactive Math Journals

This strategy provides a concrete way for students to track their thinking. For this unit I want to use Math Journals to record math vocabulary by having students create interactive foldables. They will fold paper into four equal quadrants and write their vocabulary word, definition and example. I also would like to use the journals to discover any fears or concerns my students may have about math or problem solving. For example, when students complete an activity, I will use the journals as a reflection piece for them to write how they feel about the lesson. The “Fist to Five” tool is a great strategy to check in with students on their level of understanding. Students can simply write the number in the top right corner on how they feel about the lesson.

Fist to Five Tool

1	I don't understand at all.
2	I need to go over this again.
3	I think I get it but I'm not completely comfortable.
4	I get it.
5	I get it and can explain it to someone else.

Centers

There are many aspects to Math Workshop where students can reinforce previous skills and engage in enrichment activities. I will have four different rotating centers set up in the classroom that correspond to student multiple intelligences, which will include: Verbal Linguistic, Kinesthetic, Visual Spatial and Technology. These centers will be introduced at the beginning of the unit so that all students understand expectations and activities. Students at the Technology station will use the computer and SMART board to listen to multiplication strategy videos from Brain Pop and Learnzillion. They will use the interactive tools to try out problems following the guided instruction. They will have opportunities to work collaboratively or individually and record their information in their math journal to be kept throughout the unit.

Rubrics/Surveys

Rubrics are extremely helpful in focusing on a specific skill or task. Rubrics give students a guideline to what is expected of them and helps me as a teacher evaluate and assess whether they understand. For example, if the goal or purpose of the assignment is Working Cooperatively with a group, a rubric can be used to assess this. Students would receive a 4 if they participated and respected the ideas of others 90-100% of the time. They would receive a 3 if they participated and respected the ideas of others 70-80% of the time. They would receive a 2 if they participated and respected the ideas of others 60-70% of the time, etc. Surveys will also be used to get an idea of student interest and self-assessment. Students will rate themselves on how well they completed a task or performance skill. They will reflect using their survey and in their response journals.

Cooperative Grouping

This is another strategy I would like to use with this unit so students can share ideas and learn how to work together. When placing students in groups, it is helpful to assign task jobs for each student to hold them accountable for their own learning. Some examples of task jobs include: Director, Reader, Materials Manager, and Data Recorder. (NSTA Cooperative Grouping)

Director or Taskmaster—Encourages each group member to participate and perform his or her jobs. The director may also read directions or word problems, notify the teacher of group problems or questions, and monitor the time.

Materials Manager—Gathers all necessary materials for the group. Ensures that all members are taking care of materials and using them properly, and that the work area is cleaned by all members of the group at the end of the activity.

Data Recorder—Writes ideas on a group paper once members have reached a consensus. They check for accuracy. They may also act as group reporter if needed. Students will rotate their task jobs during different plays and dramatic practices to get an opportunity to experience each task.

Activities

Week One: M & M Math (4 Basic Arithmetic Operations)

In order to lay a firm foundation of multiplication concepts, students need to have knowledge of the four basic arithmetic operations: Addition, Subtraction, Multiplication and Division. Students often complete computation problems with ease, but struggle with



operational word problems. Understanding how each arithmetic operation works will help students with Mathematical Practice Standard #1: *Make sense of problems and persevere in solving them*. Students will create a vocabulary foldable by dividing their paper into fourths and labeling each section with one operation (addition, subtraction, multiplication, division). They will use M&M's to write a sample word problem for each operation in their flap of their foldable and then develop a word problem on their own.

- Addition (Flap One) There were 18 blue M&M's and 17 red M&M's in a pack. How many M&M's were there in all?
- Subtraction (Flap Two) There were 57 M&M's in the bag when Sarah counted them. However, she became hungry and decided to eat 13 of them. How many M&M's were left in her bag?
- Multiplication (Flap Three) There were 6 packs of M&M's. Each pack had 5 pieces. How many M&M's were there in all?
- Division (Flap Four) The M&M Company want to put 8 M&M's in a pack. If they have a total of 72 M&M's, how many packs will they need?

Week 2: M&M Math (Multiples and Music)

Students will practice the multiples of 2, 5 and 10 by using catchy music and videos. Before starting multiples, students will refer to their math notebook to explain what a multiple is. They will be introduced to multiples through a short interactive video from Study Jams:

<http://studyjams.scholastic.com/studyjams/jams/math/multiplication-division/multiples.htm>

Students will use their hundreds chart to highlight the multiples of 2, 5 and 10 independently. Then they will have an option to work independently or with a partner to compose a math rap/song or poem. They will choose one of the groups of multiples to write their poems/songs. They will list out all the multiples first, then write a line or phrase that will help them remember the equation. For example, 2×2 is four, we have more to explore! 2×4 is eight, multiples are great! All poems and songs will be compiled into a class Music and Math book. Students will teach their rap or song to a second grade class during their math time. This application not only helps students apply their skills of multiples, but helps them explain their thinking to others.

Week 3: Arrays All Around Us

What are arrays? Where do we see them in our everyday lives? These are questions to pose to students before beginning the lesson. The goal is for students to apply their knowledge of arrays to real world problems and situations. For example, if the principal or custodian asked them to help set up the chairs for a school assembly, students need their background knowledge of arrays to apply how many rows and columns of chairs they need to set up. Using a real world application helps students see the relevance to learning math when they are able to see that math is all around us.

1. Teacher will give students Lego Land Proposal Letter to help them brainstorm upcoming activities in the unit ([Appendix 3](#)).
2. Students will use their math notebooks and foldables to record key vocabulary terms for the unit: array, rows, columns, factors, multiples.

3. Students will use Ken Ken puzzles to explore rows and columns. Puzzles can be found from www.kenken.com as well as www.nyorktimes.com. Ken Ken puzzles offer a great tool for interactive student learning and each game can be customized to meet the needs of all students.
4. Teacher will give students dimensions to practice drawing arrays on graph paper. Students will count the number of rows and columns and write the dimensions inside their array.
5. Stack It Relay! Students will work in learning teams to build a variety of array buildings using Lego Blocks. Teacher will use premade cards to call out dimensions to an array to all learning teams. Ex. 4 X 6. Students will work as quickly as they can with their Lego blocks to build the corresponding building. The first team to accurately create the building scores a point for their team.

Dimension Card #1

4 X 6

6. Students will brainstorm themes for their city such as toyland, candyland, bookland, doughnut city, etc. Then they will create a design for their city using graph paper and their blueprint design will include at least 10 buildings.
7. Students will research the history of Legos. When and where did they start? They will build a class timeline to show how the Lego Cooperation looked in the past, how they look in the present and how they will look in the future (their city theme ideas can be the future section of the timeline).
8. Students will create story problems that correspond with their blueprint arrays.
9. Task cards will be available for students to extend their thinking and knowledge of arrays ([Appendix 4 and 5](#)).
10. Students will use their blueprint designs to create real “buildings” using Lego blocks. They will use a checklist/rubric to guide their Lego Construction ([Appendix 6](#)).
11. Take Me to the City! Students will write an informational paragraph to explain how to get to different buildings within their city using cardinal directions: North, South, East and West ([Appendix 7](#)).
12. Lego Proof Party! Students will share their LegoLand designs to their learning teams, class and host mini drop in sessions for other students around the school to explore.

This unit is packed with real life examples and ways students can apply their problem solving skills. I want students to walk away from this unit with a firm understanding of multiplication, problem solving and confidence in math. With perseverance, anything is possible!! Let's start building!!

Implementing Teaching Standards

Math Common Core Standards

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

This unit will mainly focus on Mathematical practice 1 and 4. By making sense of problems, students will be presented with a challenge question/task to determine their best strategy for solving the problem. The challenge question and tasks will be used in this unit through multiplication task cards and the Lego Building Proposal. Students will Model with Mathematics using colored tiles, Lego blocks and cubes.

CCSS.MATH.CONTENT.3.OA.A.1

Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5×7 .*

CCSS.MATH.CONTENT.3.MD.C.7.A

Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

Social Studies Objectives

3.G.1.1 Find absolute and relative locations of places within the local community and region. Students will use their blueprint designs as a map to give directions to buildings within their city. They will choose three feature buildings they would like tourist to visit and write directions to those three places. They must use key terms such as North, South, East and West.

3.H.2.1 Explain change over time through historical narratives (events, people, places). Students will research the history of the Lego company and how it has changed over time. They will research major cities in North Carolina such as Charlotte, Winston-Salem and Raleigh to explain how they have changed over time.

Language Anchor Standard

[CCSS.ELA-LITERACY.CCRA.L.6](#)

Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression. Students will apply their vocabulary skills by using their math notebooks and math foldables.

Math Survey

	Agree	Disagree	Not Sure
Math is confusing.			
Math is fun!			
I like to do math in “my head.”			
I enjoy doing problems when I know how to work them out.			
I use math everyday			
I get confused with word problems.			
I enjoy when math is challenging and I have to solve the mystery.			
I am strong with telling time.			
I am strong with counting money.			
I am strong with multiplication.			
I am strong with measurement.			

Lego Land Proposal:

The builders of Lego Creations need your help!!! We are looking for new designs for our next product. We know that you are learning multiplication and building arrays. Use that knowledge to help design your new city. Be creative!! This product will be sold all over the country in stores such as Walmart, Target and Toys R Us. We have included a checklist of items we need in our next product. All submitted projects must meet program requirements in order to be eligible for the grand prize! Please complete all project designs by: _____.



Program Requirements:

Building Designs:

- Create a blueprint of 10 different array buildings on graph paper
- One building must have twice the number of rows than columns
- One building must have twice the number of columns than rows
- One building must have only one level so the Lego trucks can drop supplies off
- Create names for each one of your buildings by writing or attaching labels

Area

- The area of each building must be less than 144 square inches
- The area of each building must be more than 10 square inches

Perimeter

- The perimeter of each building must not exceed 48 square inches

Final Product

- Use Legos to make a model of your blueprint. Dimensions must correspond to blueprint designs.
- Take a picture of final product and mail it to the email address below.

LEGOLAND Products, Inc.
Attn: Head Donation Central
12345 Make It Road
Charlotte, NC 28215

Lego Land Task Cards

<p>Task Card #1 </p> <p>Design a 12 X 2 array. How many rows will you need? How many columns?</p>	<p>Task Card #2 </p> <p>Design a building that has more rows than columns. What are the dimensions?</p>
<p>Task Card #3 </p> <p>Create a building that has twice the number of rows than columns. What are the dimensions?</p>	<p>Task Card #4 </p> <p>Create a building that has twice the number of columns than rows. What are the dimensions?</p>
<p>Task Card #5 </p> <p>Create a 5 X 4 array. What is the area? What is the perimeter?</p>	<p>Task Card #6 </p> <p>Create a 10 X 2 array. What is the area? What is the perimeter?</p>

Lego Land Challenge Task Cards

<p>Task Card #1 </p> <p>There are 6 buildings that have a dimension of 4 X 6. How much paint is needed to cover the perimeter of all six buildings?</p>	<p>Task Card #2 </p> <p>There are 5 buildings that have a dimension of 10 X 2. How much paint is needed to cover the perimeter of all five buildings?</p>
<p>Task Card #3 </p> <p>Use the area model to show the amount of carpet needed to cover a building that is 12 X 15.</p>	<p>Task Card #4 </p> <p>Use the area model to show the amount of carpet needed to cover a building that is 20 X 15</p>
<p>Task Card #5 </p> <p>Combine 3 of the buildings from your blueprint. Determine the area and perimeter for the combined building.</p>	<p>Task Card #6 </p> <p>Determine the amount of paint needed to paint the perimeter of all 10 buildings from your blueprint.</p>



LegoLand Checklist

Look at each box carefully and give yourself a score of 3,2 or 1.

3= Work is complete and accurate

2= Work is partially complete or partially accurate

1= Work is incomplete or not accurate

	Student Check	Partner Check	Teacher Check
<input type="checkbox"/> I completed a blueprint of my array buildings by drawing at least 10 arrays.			
<input type="checkbox"/> I clearly labeled each building (text feature application).			
<input type="checkbox"/> I followed the criteria from the program letter.			
<input type="checkbox"/> I used time management and self-control to make my buildings with Legos.			
<input type="checkbox"/> I completed my reflection questions below.			

Reflection Questions:

1. When you create a building with more rows, does that mean it will be wider or taller? How do you know?

2. Describe characteristics of the buildings in your city. Give two reasons WHY LegoLand should choose your design.



Take Me to the City!!!

Martin Martian is coming to visit your city. He is so excited and can't wait to see your wonderful buildings and designs. Use what you know about cardinal directions (North, South, East and West) to help him get from building to building in your city. Choose three feature buildings you want him to see. Make sure you are precise so he doesn't get lost!!

Sketch of City

1. Directions to: _____

2. Directions to: _____

3. Directions to: _____

Works Cited

- Boaler, Jo. *What's Math Got to Do with It?: How Teachers and Parents Can Transform Mathematics Learning and Inspire Success*. Revised ed. Penguin, 2015. Print. A guide to how teachers and parents can work together to help students achieve academic success.
- Carpenter, Thomas P. *Children's Mathematics: Cognitively Guided Instruction*. Portsmouth, NH: Heinemann, 1999. Print.
- Eureka Math: A Story of Units*. Print.
- "How Do Students Build an Understanding of Place Value in Investigations?" *How Do Students Build an Understanding of Place Value in Investigations?* Web. 19 Sept. 2015.
- Kazemi, Elham, and Allison Hintz. *Intentional Talk: How to Structure and Lead Productive Mathematical Discussions*. Print. Intentional Talk provides teachers with a framework for planning and facilitating purposeful mathematics discussions that enrich and deepen student learning.
- Reiter, Harold. "Understanding Fundamental Ideas in Mathematics at a Deep Level." Harold Reiter's Home Page. Accessed October 31, 2015. <http://math2.uncc.edu/~hbreiter/>.
- "Teaching Models: Grade 3." *Teaching Models: Grade 3*. Web. 27 Sept. 2015.

MLA formatting by BibMe.org.

ⁱ Dr. Harold Reiter, <http://math2.uncc.edu/~hbreiter/>.