Mathletes United

Christine Johnson

Summer 2015

Grades 5-8

Part One, Introduction:

Mathletes United

"Have you ever wanted to part of a team? Join us for an exciting week of fun as we play games to grow and show our knowledge in math. You will be part of a team tackling challenges on different math concepts to earn points. At the end of the game, you will have created a team play book that details all of your strategies."

Mathletes United was created to bring like-minded young mathematicians together for some friendly competition in a relaxed classroom setting. The skills brought into the classroom by Academically and Intelligently Gifted students is what makes Mathletes come alive. Students will bring their math knowledge, problem solving skills, out-of-the-box thinking, curiosity and competitive edge to create a list a strategies to bring back into the classroom to build to apply to our daily lives. These skills are important to constantly develop in an AIG setting to continue to challenge young minds and stretch their imaginations. The friendly competition will allow a safe environment for students to not only challenge each other, but learn from each other. Students will make connections with each through the common interest of mathematics.

The content the students will be exposed to is rich and challenging. Students will need to rely on their pervious learnings in a math classroom to be successful during the Mathletes activities. The content the students will be exposed to is at their level, however they will need to find alternative routes to playing games, solving problems and to clearly explain their reasoning. Students will be challenged though questioning; the what if's, how's and why's will need to be explained.   The students will not only have these questions asked of them, but they will be asking those same questions of each other. Students will have the opportunity to create questions and tasks for others to complete.   Though new challenges students will make the connections between the new tasks and prior knowledge. The questions that constantly should be asked are "why, how, when is it appropriate, please explain." Students will be able to showcase their knowledge along with acquiring new skills.

The key concept that will clearly link all the lessons and activities together is connections. Connections are the key; students see connections daily in our learnings in and out of the classroom. Through connections students can find and clarify understandings. The idea of connections will link not only math concepts together but also other subjects and topics. If students make connections in their learnings, ideas, findings and process they can create new processes and alternative problem solving skills. Students will all have an equal opportunity in the classroom to compete and to learn.

This unit is appropriate for gifted learners because the content is challenging, yet familiar. The lessons and activities will build on what the students know, but the complexity of the questioning will allow the AIG students to truly think about the process of solving the mathematical situations brought to them. Students will also have the opportunity to challenge each other by creating math based questions for their peers to work through and answer. Making connections with the students' prior knowledge will allow the learners to build their confidence in their ability to answer the questions in group settings.

Throughout this unit students will dig deeper into the mathematical concepts posed to them. For example students will be asked to solve the following problem: 2x+8((x-2)4) +9, when x=6. First the students will solve the equation and come up with an answer that makes sense. Once the students have found the answer they will be asked to explain the process they used to solve the equations and then they will be asked to re-write the equation in a different way that will give the dame answer. Classmates will check each other's work and "challenging" each other through probing questions. Forcing classmates to think will allow gateways of making connections to be opened. Making connections will solidify prior knowledge of math concepts and allow the opportunity for new thoughts and ideas to emerge.

Students will work in teams to complete math activities, games and answer questions. Working in teams will allow the students to work with others who have similar process skills. Students will work collaboratively towards a challenging goal. When problem solving there is no "rules" the students have to follow, they are free to solve any way they choose. When playing math games students will initially be asked to follow the rules given, but once the game is complete the students will then be asked how they can modify the game and create new rules. Students will show their skills by creating new rules and processes to complete similar goals.

Allowing students to be creative will give them the opportunity to showcase their knowledge and skills. AIG students enjoy the challenge of "stumping" each other, in addition to the challenge of stumping a peer AIG students enjoy the challenge of overcoming a difficult problem. The performance task will also allow the students to demonstrate creativity in creating, solving and achieving in a mathematical setting. Students will be asked to create a math game from younger students, this will allow for success because students will be familiar with the concepts and they will be challenged because they will need to create rules, tactics and goals for a game that will demonstrate mathematical skills.

This unit, Mathletes United, is intended for Durham Public School students who have been identified as gifted going into grade 5-8. Students should have a strong interest in mathematics, challenges, group/team work, be creative and have a strong desire to learn. Students participating in this unit will thrive when they come together with other like-minded AIG students. Students will create their own groups; this will allow the students work together and to learn from each other. The games played in Mathletes will require strategies and deep thinking, working with their peers; students will have the ability to bounce ideas and processes off each other.

Mathletes will give the students the opportunity to come together with a common goal in mind……to be challenged in mathematical ways outside their daily classes and work together. The students will have a true understanding of how a classroom runs, however this class will be open for the students to create their own rules and policies. This class will be an opportunity for AIG students to showcase their knowledge and to build on what they know from their prior years in school.

Part Two, Goals and Outcomes:

Content Goal:

  The content goal of this unit is to take current standards that the students are familiar with and ask them to look at those standards in a different way. The challenge comes in when the students are ask to solve a problem with a non-traditional method and then to explain that method to another, how it works and why it works. Questioning will allow the students to defend their methods. "Will that process always work? Explain why this works. How will this work in a real life situation? Where are the connections to the math we have learned previously? What are the connections that make this work in the first place?" Common Core standards consistently ask for content to be connected to real-life situations. This unit will allow connections to real-life to be made throughout the activities and tasks. Students will be asked in a performance task to relate the content learned back to the classroom.

Process Goal

      The process goal for this unit is for students to work collaboratively in towards a common goal. Students will use mental math and participate in in-depth critical thinking in student groups to connect the concept of connection to knowledge. Students will have the opportunity to work with others to truly use and stretch their minds with everyday math concepts to create and demonstrate connections.

Concept Goal

Connections are the concept that is has been aligned and embed throughout the unit. Through connections AIG students will have a clear understanding of mathematical concepts and how they connect to their prior mathematical knowledge along with the knowledge of other subject areas. The goal set for the students is they will solve a mathematical problem and then find other ways to solve the same problem. This will allow the opportunity for connections to be made; "if I do this then this will happen. But, if I solve the problem this way then it will give me a different answer. The connection is _____." When students start verbalizing their findings they will clearly see the connections throughout the unit along in the math classroom. Problem solving will occur in a small group setting, allowing the students to make connections with each other. Students will make connections with each other within their groups, they created.

Part Three, Assessment Plan

       Throughout this unit, Mathletes United, there are many formative assessments and one summative assessment. The formative assessments are embedded in each lesson in the form of questioning, student observations, minute by minute assessments, "playbook" check in and overall participation and engagement in the activities. Formative assessments will show and inform the instructor where the students are at and if they are understand the overall concept of making connections in mathematics, not only in the classroom but also in real-world situations. Students will also have the opportunity to ask questions throughout any lesson, activity or game. The instructor will take notice if the questions asked by students are clarifying questions or challenging questions. Challenging questions are encouraged.

       The summative assessment will be in the form of a performance task. Students will be given the performance task and free reign to create what their imagination will allow. The performance task is as follows:

G: Your task is to create a math game for younger AIG math students
R: You are a child who loves math and you feel as though you have knowledge, ideas and concepts to share in a fun and innovated way.
A: Your teachers feel that you are the best person for the job. You are AIG and you know what younger AIG students are look for.
S: The challenge involves you creating a game that in interesting for younger learners and convincing them your game is the best way to learn new content.
P: You will need to create a game with rules, instructions and clear content
S: Your work will be judged by the ability to play your game and to practice mathematical content.

Performance Tasks will be grade with the following rubric:

Appearance	Content	Creativity	Rules	Concept	Totals
3 Game has color, clean cuts and edges and is appealing to the eye	3 The content needed is challenging, but obtainable	3 The game is unique and one of a kind	3 Game has clear and easy to follow playing rules	3 Students must make connections with prior knowledge and real-life situations to play the game	
2 Game has some color, looks intriguing	2 The content needed is familiar	2 The game is a modification of a game played in class	2 Game has rules but are slightly unclear	2 Students need to make some connections with prior knowledge and real-life situations to play the game	
1 Game has no color or eye appeal	1 The content is too easy and not a challenge	1 The game is familiar with no modifications	1 game has no rules	1 students do not need to make connections to play the game	

Total Points   /15

Part Four, Lessons

TEACHER NAME		Lesson #
Christine Johnson		1

MODEL	CONTENT AREA	GRADE LEVEL
Taba Lesson Plan	ELA/Math	6th

CONCEPTUAL LENS	LESSON TOPIC
connections	Connections inform knowledge

LEARNING OBJECTIVES (from State/Local Curriculum)

CCSS.ELA-LITERACY.CCRA.R.1

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

6.EE.2

Write, read and evaluate expression in which letters stand for numbers.

THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?	THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Connections inform knowledge	How do connections inform knowledge?

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
Students will Know: Connections are made when we can use our personal lives	Students will be able to : Create personal connections to the text Write algrbraic expression to relate to real-life

Connections are made when we can draw on personal experiences and connect them to new text The following vocabulary: evaluate, sum, term, product, expressions	situations Identify parts of an expression Use order of operations to evaluate expressions

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What are connections? How do we make connections? What is knowledge? When do we know that we have connected knowledge to the real-world? How do making connections and knowledge work together? Where is math connected to the real world?	What are you connecting back to your life? What is the value of making connections? What do we learn when we make inferences? What understandings come about when making connections? Are there specifics from the text that allow you to make connections? What connections can you make from the article and your personal life? What mathematical situations are occurring in the story? What must we know about math to understand this story?	What relationships do you see between knowledge and connections? What connection scan you that would apply to the lists and grouping you created? What further connections can you draw from the text? Through these connections what knowledge did you gain? What mathematical reasonings are important to know in this situation, (from the story)?

DIFFERENTIATION			
(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.			
Content	Process	Product	Learning Environment
The reading selection is at an advanced Lexile.	Students will participate in in-depth critical thinking in student groups to connect the concept of connection to knowledge.		Students will be place in groups based on their current Lexile number.

PLANNED LEARNING EXPERIENCES
(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)
Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.   Ice Breaker: When the students come into the room they will be each given a picture (each of the pictures is a real life connection; a phone call, friendship, circuit board, etc). The direction will be for the students to find other photos they belong with. How are these photos related? How do we make connections? How do connections and knowledge work together? Next expressions will be passed out to the group on small cards, the students will be asked to find their math….but the matches are not identical, they will be equivalent expressions. Where do we see two different things that have the same meaning?

Students will begin this lesson by exploring the definitions of connection and knowledge. They will be allowed to work in groups of three to create definitions to the following words: connections, relationship, math, and real- life situations. Each group will have one work to "define," the groups will write their definition on the piece of paper that will then be discussed and posted in the room to refer back to throughout the week.   Once all students have had the opportunity to find the definitions as a class we will discuss those, this will result in everyone having a clear understanding of those terms and an idea of the days lesson.

Students will next choose their groups. They will work in teams of three throughout the week on class activities and group work. They groups will need to create a "team name" to display on their desks. The team name will need to be connected to math. They must be able to explain the connection to math.

Teams will earn points together, which will be displayed on the board.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Students will be asked to read the short story "Mr. Max the Math Teacher." This story is meant to be read closely to determine what the text says explicitly and to make logical connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. As students read this story they are expected to make lists.

Read this article and create a list of anything that reminds you of connections.

Story: http://www.readworks.org/passages/mr-max-math-teacher

Once these lists have been created students will share out to the class, the teacher record the lists on the

board, the teacher will list at least 20 items on the board.

Explain - Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.

Once one list has been created on the board, all class members participated, students will then be asked to create smaller word list based on similarities and how they relate to the concept of connections. Students will work in small groups of 3. They will use the word lists on the board to create smaller lists. They will keep connections and knowledge on the forefront of their minds. Students will be asked to create 3 to 4 groupings. In each group they are able to use the words from the class list on the board. They are not able to use any word more than once, but if there is a disagreement the students are to discuss to word and come to a consensus about where that specific word should be placed.

The teacher will walk through out the room asking open ended questions, and guiding groups with questions about connections and knowledge. Students will also have the opportunity to ask clarifying questions and the teacher will guide the groups to finding those answers. Once the groups have created their "new" groups, they will be asked to re-group the words again. When re-grouping students will be asked to identify the connections between the groups.

Elaborate —Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts,

and apply their understandings to the world around them in new ways.

Teacher will ask post lesson questions.

In student's play books students will be asked to create the steps to making connections when it involves math and daily life, this will be done as a team of three.

Each of the groups will be given an expression written on a note card. They will then need to create a real-life situation that explains that expression.

Steps needed:

1. Identify a situation (1 point)
2. Write a story problem (2 points)
3. Solve the equations (1 point)
4. Write the steps to the equations (2points)

    The groups will then trade their story problems with another group and solve their problem, if they successfully solve another groups story problem there will be an additional 2 bonus points given. If a group is unable to solve the problem the creating group will earn their 2 bonus points.

Evaluate: This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.

Students will next be ask to create 5 math problems that relate to the real world. These must be grade level appropriate, not just adding, subtracting, multiply and dividing. These questions will but shown under the doc cam for student to solve. This will be a game where one student from each team will come to the board to solve. The first person correct and finished will earn 2 points for their team each

other student with a correct answer will earn one point for their team. This will also wrap of the end of class.

Students will also be assessed throughout the lesson, during independent work time, small groups, through facilitation when the groups communication. Students will be asked to reflect upon their group work as well.

TEACHER NAME		Lesson #
Christine Johnson		2

MODEL	CONTENT AREA	GRADE LEVEL
Questioning	Math	6th

CONCEPTUAL LENS	LESSON TOPIC
Connections	Rational numbers (percent)

LEARNING OBJECTIVES *(from State/Local Curriculum)*

6.RP. 3
Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

7.RP.A.3
Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Connections inform knowledge	How do connections inform knowledge?

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
Students will know: • Ratios are connected to multiplication and division • Percent of a quantity • The following vocabulary: part to part, part to whole, percent and equivalent rational numbers	Students will be able to: • Solve percent problems • Solve part to whole percent problems • Find the whole given the part

GUIDING QUESTIONS
What questions will be asked to support instruction?
Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What are rational numbers? How do we use rational numbers in our daily life? What are the connections to what we learn in math to what we already know? Where do we see percent most	When are there opportunities daily to calculate percents? What is the connection between percents and money? What is the relationship between what we know and what we are	How does this apply to life outside the classroom? Where are percent useful? Explain the process of calculating percent? Why is the knowledge of

often? List as many places as possible?
When is it necessary to compute percents? Why?

current learning?
How is what we are doing now, percents, connected back to yesterday, connecting to real-life through expressions?

computations important?
How are these connections we are making influencing knowledge moving forward in math, school, life?

DIFFERENTIATION
(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
The content it an extension of the grade level standards.			This is a collaborative, student driven/focused activity. Teacher facilitated.

Engage and Connect - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

When the students come in to the classroom they will see copies of restaurant receipts. The receipts will show food ordered with the total cost. There will also be a "pile" of fake money. The money is to represent the total money left. This will allude to the amount left on the table for a server. The students will have the opportunity to walk around the room and see all bills and money.

Once the students have all arrived and walked around the room they will be asked to make a list of question. They will not necessarily know they are going to be asked to find the amount left for the server. (Expected questions, how much money, why is there too much to pay the bill, is that a tip, what do we have to do?) They will also be asked to speculate what they might need to do. (Expected questions: figure out the change, how much was the tip, what is percent of the tip?)

The questions will be shared out and discussed.

The students next will be asked to work as a group to figure out how much money was left for a tip and then find the percent of the tip. The connection here is to real-world. The students will have an opportunity to share their experiences at restaurants and how much things cost. Answers will be shared out and verified by the other groups.

A small amount of direct instruction will be given at this point to refresh how to find percent, and how those covert.

Explore - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

Teacher asks the pre-lesson questions. Students will have the opportunity to raise their hands to answer the questions and share out. If the question seems to stump the students the teacher will ask for the students to discuss the questions in their small group before they share out. Mathematical discourse is key in this lesson.

Next student will play Percent Scramble

Precent Scramble:
Rules:

On your turn, flip over a percent card and a number card. Then repeat with two new cards. You should have a two

pairs of cards, each with one percent card and one whole number card. You may not mix and match the cards. See the example below.
*You may also modify the game so that each player draws only one percent card and one whole number card each turn. Then they find the percent of that number.

Once the students have played all five rounds they will, as a small group of three, create situations that would be represented in each round. This will create real-world connections along with applying their prior knowledge.

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

The teacher will now ask during lesson questions. These questions are meant to get back into the elaborate portion of the lesson; we will be connecting back to order of operations from the prior day. How are percent and expression related? Why? Explain your reasoning. How might we see these in places other than math class?

Students will first discuss as a group and then share out. A list will be created by a student on the board.

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*
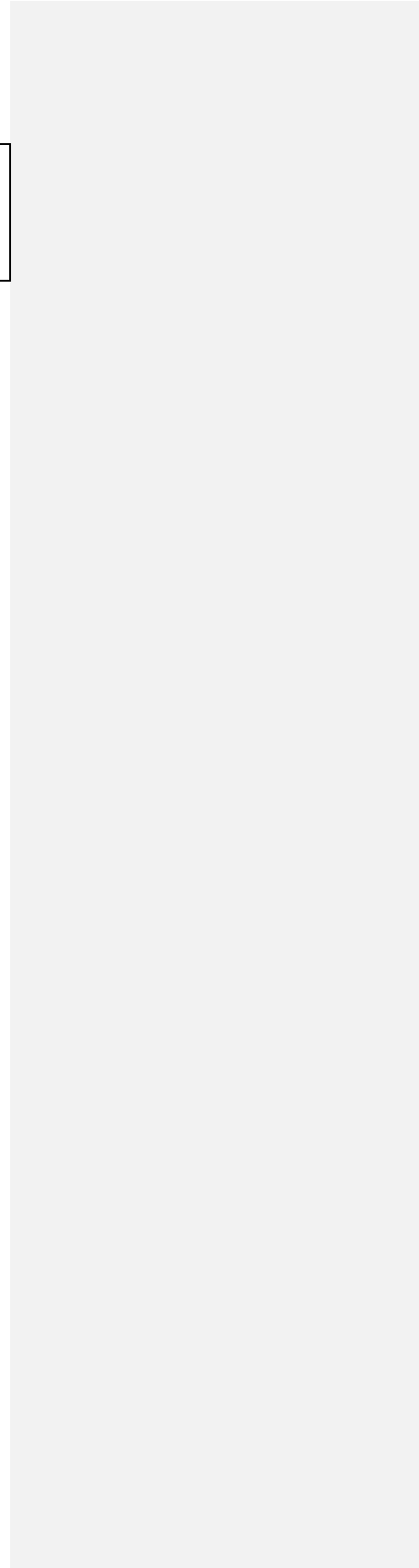
Students will now play "Order of Operations a Riddle for Hands on Learning." They will play at level 3. Level three is the most challenging allowing students to use different functions to create expressions to make the answers true. (attached)

Students will work in their team to create riddles that are accurate. For every correct expression the team will receive one point for a max of 12 points. The first team complete with all the correct answers they will receive 2 bonus points.

This activity will allow the students to connect what they have learned from the prior day to today's lesson. Order of operations is key to moving forward in math.

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Students will be asked to write in their play books 3 questions involving percent, order of operations, and expressions. These will be taken by the teacher to create the Thursdays final challenge game. This will give the teacher an opportunity to double check where all the students are at, making sure they are making connections based on their prior knowledge.

TEACHER NAME		Lesson #
Christine Johnson		3

MODEL	CONTENT AREA	GRADE LEVEL
none	Math	6th-8th

Formatted: Font: (Default) Calibri, 14 pt

CONCEPTUAL LENS	LESSON TOPIC
connections	Expressions

LEARNING OBJECTIVES *(from State/Local Curriculum)*

6.EE.2 Write, read and evaluate expressions in which letter stand for numbers.
   a. write expressions that record operations with numbers and with letters standing for numbers.
   b. identify parts of an expression using mathematical terms.
   c. evaluate expressions using specific values for their variables
7.EE.B.3
Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Connections inform knowledge	*How do connections inform knowledge?*

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
Students will know: • The definitions: sum, term, product, factor, coefficient • Variables can be used to represent unknown numbers • Expressions can be multiplied to generate equivalent expressions to simplify the problem • Expressions con be composed and decomposed	**Students will be able to:** • Solve algebraic expressions • Write algebraic expression to represent real life and mathematical situations. • Identify parts to an expression using appropriate terminology • Given the value of a variable students will evaluate an expression • Use order of operations to evaluate and expression.

GUIDING QUESTIONS *What questions will be asked to support instruction?* *Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding*

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What do we know about algebra? How is algebra connected to school? **What knowledge do we need to have to connect algebraic expressions to daily life? What do we need to know to solve algebraic expressions?**	**How can we connect to expressions? Where do we connect to expressions daily?** **What knowledge do you need to know to solve these situations?** **How do we connect that knowledge in our classroom?**	**How have we learned through making connections with this game? What mathematical reasonings are found though this game?** **How can we connect what we know to this game? Are there other situations that could be applied to this game?**

		How was the game relevant?

Content	Process	Product	Learning Environment
The content is challenging and presented in a new way.	Students will use mental math to solve expressions.	Students will create an algorithm to solving algebraic expressions.	

<u>**Engage and Connect**</u> - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

When students come into the room the song "Ice Ice Baby" will be playing on a loop and they will see dice throughout the room. Once the song has played through 2 times the lyrics to "Dice Dice Baby" will be posted on the board. The students will be asked to sing the song to the tune they just heard.

Once the song is complete the groups will have a discussion about how the lyrics connect to math.

Pre lesson questions are asked.

<u>**Explore**</u> - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

Students will then be introduced to the game Dice Breakers. The rules will be explained and the students, (game attached).

GAME 1: DICE BREAKERS
Practically all of us have participated in icebreakers before. They are a great way to get to know people and have fun at the same time, so what better way to kick off your club? Dice Breakers is part game, part icebreaker, and your students will have fun playing it again and again.
Participants: 4 or more students
Skills Practiced: Mental math, computation, algebra
Materials: 1 6-sided die; Dice Breakers Card (each pair of students should have their own copy of the Dice Breakers Card); stopwatch (optional)
Note: 2 Dice Breakers Cards are included, and each card can be used multiple times, since rolling the die changes the outcome of each game.

Setup:
•
Have students form pairs and spread apart so that no pair can see another's card.
•
Pass out one Dice Breakers Card to each pair facedown. Tell the students not to look at the card until instructed to do so.
Note: Every pair should start with the same blank Dice Breakers Card. Two have been provided in case you wish to play multiple times.
•
You, the Club Leader, will keep the die that will be used during the game.
•
Once all students are ready and each pair has a copy of the card, explain the rules of the game (below)
How to Play:
1.
Each pair has a copy of the same, blank 24-square Dice Breakers Card. The left side of the card has 12 expressions, each with a whole number missing and an operation missing; the right side has 12 whole numbers (surrounded by a hexagon), each of which represents a potential answer to one of the expressions on the left.
2. When the Club Leader tells the students to begin, the Club Leader rolls the 6-sided die 12 times—once for each missing number in an expression square—and says the number s/he rolled for each expression. Note, the squares are labeled with letters A-L, so that it is clear which roll goes with each expression. Club Leaders should say, for example, "Expression A is [# rolled]; expression B is [# rolled]..." and so on as s/he rolls the die, until s/he has rolled once for every expression square.
3. As the Club Leader rolls and announces the missing number (# rolled) for each expression square, one of the students in each pair should fill in the missing number (# rolled) for each expression, starting with square A and continuing until every missing number is filled in for the 12 expressions.
4. Immediately after all expressions have the missing numbers filled in from the rolls, the students in each pair should have 2 minutes to try to match as many expressions with answers as possible.
5. Students "match" expressions to answers by selecting the operation (addition, subtraction, multiplication or division) that could result in an answer on the right side of their card. For example, consider having the following expressions and

answers to work with: attached.
Then the students would have the following options for the expression with 4 and 3:
•
4 + 3 = 7 • 4 − 3 = 1 • 4 × 3 = 12 • 4 ÷ 3 = 1⅓
And they would have the following options for the expression with 2 and 6:
•
2 + 6 = 8 • 2 − 6 = −4 • 2 × 6 = 12 • 2 ÷ 6= 1/3
In this case, although both 2 × 6 and 4 × 3 would result in a match for 12, the best strategy would be to use 2 × 6 = 12 so that students could use 4 + 3 = 7 and get a match with the answer 7 as well.
6. Students must fill in their cards as they go, so following the example above, the students would write the following information on their cards: attached.
7. It is important to note, students can use each expression only once and cannot switch the order of the numbers around. This means that they must figure out the best strategy to get the most matches. It also means that they will likely not be able to match every expression with an answer.
8. After 2 minutes, the Club Leader will yell "Time!" and all students must put down their pencils and stop working.
9. Each pair then will share with the rest of the club what they did and how many matches they were able to make in the 2 minutes. Students can discuss what alternative solutions other pairs had, and then see if any other pairs were able to get more matches.
10. If your students catch on and get better at matching, you can reduce the amount of time they have to 1 minute or 30 seconds, to make the game more fast-paced and challenging.
Note: The 2 minutes will go by very fast, and students may want to try again. We recommend having enough blank copies of the Dice Breakers Cards for a few games.

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*

Students will now create a list as a group of connections they have made throughout the game. What they noticed, what they already knew, ect. This will completely driven by the students with the teacher only inserting guiding questions when the students get students. A list will then be created on the board by the teacher. Throughout the game were solving expressions and equations, where might we need to do that besides math class? Why? How is this relevant to our lives? How will learning now, connect us to the future? What knowledge do we need to move forward?

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

We have now played a game creating equivalent expressions and identified how it connects to our lives, and we have discussed what knowledge we need moving forward in life, grade to grade and daily activities.

Students will now create their definitions to the vocabulary words. (This might not be necessary depending on how the game goes).   They will work in their groups to create the meaning for the words.
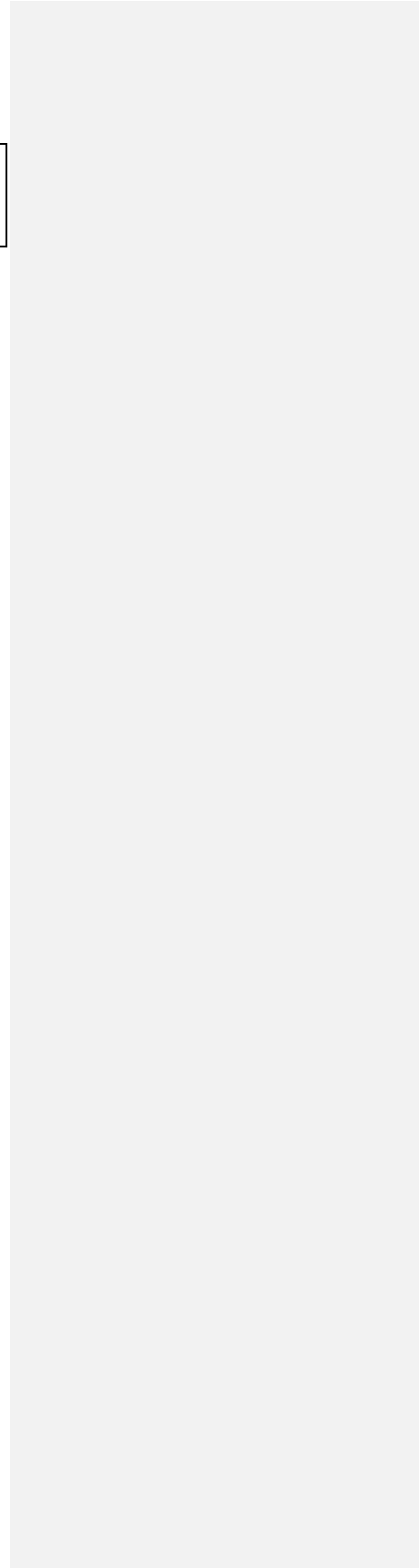Students will also work together as a class to create a step by step process to solving expressions. This will be recorded in their play book.

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*
Students will know have the opportunity to work as teams to solve the following problems:
(first group done with the correct answer will receive 2 points, each additional team with a correct answer will earn 1 point)

1.) If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
2.) The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

TEACHER NAME			Lesson #
Christine Johnson			4
MODEL	**CONTENT AREA**		**GRADE LEVEL**
Questioning	Math		6-8
CONCEPTUAL LENS		**LESSON TOPIC**	
connections		Proportional relationships	

LEARNING OBJECTIVES *(from State/Local Curriculum)*

CCSS.MATH.CONTENT.7.RP.A.2.A
Decide whether two quantities are in a proportional relationship
CCSS.MATH.CONTENT.7.RP.A.2.C
Represent proportional relationships by equations.

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?)*	**THE ESSENTIAL QUESTION** *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Connections informs knowledge	How do connections inform knowledge?

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	**PROCESS SKILLS** (What will students be able to do as a result of this lesson?)
Students will know: • Equivalent measures • When fractions can communicate proportions • How to select proportions to aide and empower problem solving.	Students will be able to: • Calculate proportional relationships • Describe real-world situations about proportional relationships

GUIDING QUESTIONS
What questions will be asked to support instruction?
Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What is mental math? What do we need to know to compute numbers in our heads? What connections can we make to what we already know about mental math?	How are we making connections? What is knowledge? How did we know that we have connected knowledge to the real-world? How do making connections and knowledge work together? Where proportions connected to the real world?	What was need to know in order to play the game Lightening War? How can we connect the knowledge use in the game to the knowledge we use in math class, or in daily life. How does making connections build our knowledge of the real-world? (wrap-up reflection question)

DIFFERENTIATION
(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.)

Content	Process	Product	Learning Environment
	Mental math and computation		This is a collaborative, student driven/focused activity. Teacher facilitated.

Part Five, Resources

Websites:

Math Counts Foundations- http://www.mathcounts.org/

> The math counts website will introduce students to friendly math competition in a school setting. Math Counts has many activities that revolve around state standards in the form of competitive games.

Great Minds- http://greatminds.net/

> Great Minds offers many free resources to teachers. Eureka Math is part of great mind and the Great Minds website offers 45,000 pages of free curriculum including lesson plans and assessments.

Teaching Channel- https://www.teachingchannel.org/

> Teaching Channel is a place where educators can come together as a community to share ideas and strategies.

Discovery Education- http://www.discoveryeducation.com/

> Discovery Education offers many videos, digital steaming and text books just to name a few for classroom use in aligned with standards and content.

Buzz Math- https://www.buzzmath.com/

> Buzz math is a website where students can login in and practice specific math concepts.

Bandy, Joe. What is Service Learning or Community Engagement?” 2015.

    1 May 2015 <http://cft.vanderbilt.edu/guides-sub-

    pages/teaching-through-community-engagement/#what>

Bruner, J. (1996). The Culture of Education. Cambridge, MA: Harvard

    University Press CEC-TAG positions Statement on Growth Models- u
    http://cectag.com/wp-content/uploads/2012/04/Growth-Models.pdf.

Horowitz, S.H. (2013). Giftedness and Learning Disabilities. National Center for Learning

    Disabilities. August1,2015, from http://www.ncld.org/types-learning-disabilities/adhd-
    related-issues/giftedness/giftedness-learning-disabilities

Renzulli, J., Leppien, J., and Hays, T. (2000). The Multiple Menu Model: A Practical Guide
    for Developing Differentiated Curriculum. In University of Connecticut: The
    National Research Center on the Gifted and Talented.
    http://www.gifted.uconn.edu/mmm/mmmart01.html.

Ryser, G&Rambo-Hernandaz, K.E. (2014 January). Using growth models

    to measure school performance: Implications for gifted learners.

    Gifted Child today, 37 (1), 17-23.

Tangient LLC. (2013). Definition of the Parallel Curriculum Model. In GiftedEdResource.
    http://giftededresource.wikispaces.com/Definition+of+the+Parallel+Curriculm

Toppe, Chris, Ph.d. Delivering the Promise, The Impact of Service

    Learning. Senior Social Scientist. Washington D.C., 2006.

Venn, J. J. (2000). Assessing students with special needs (2nd ed.). Upper

    Saddle River, NJ: Merrill.

Van Tassel-Baska, J. (July 18, 2008). What works in Curriculum for the Gifted? Keynote
    address, Asia Pacific Conference on the Gifted.

"What is RTI?" RTI Action Network. A Program National Center Of

        Disabilities. 2015. Web. 1 may 2015.