

Teacher(s)	Hawkins	Subject discipline	group and	7 <sup>th</sup> Grade Math	
Unit title	Expressions and Equations- Unit #2	MYP year	2	Unit duration (hrs)	33

**Inquiry: Establishing the purpose of the unit**

Key concept	Related concept(s)	Global context
Form	Model, Justification	Fairness and development
<b>Statement of inquiry</b>		
When creating a product justification and fairness can be expressed with the model and form of an equation.		
<b>Inquiry questions</b>		
<p><b>Factual—</b> What are the rules for solving multi-step equations?</p> <p><b>Conceptual—</b>Why is there a logical system to simplify mathematical expressions?</p> <p><b>Debatable—</b> Do you have to simplify an equation before you solve it?</p>		

Objectives	Summative assessment	
<p>A. Knowing and Understanding</p> <p>i. select appropriate mathematics when solving problems in both familiar and unfamiliar situations</p> <p>ii. apply the selected mathematics successfully when solving problems</p> <p>iii. solve problems correctly in a variety of contexts</p> <p>B. Investigating patterns</p> <p>i. select and apply mathematical problem-solving techniques to discover complex patterns</p> <p>ii. describe patterns as general rules consistent with findings</p> <p>iii. prove, or verify and justify, general rules.</p>	<p>Outline of summative assessment task(s) including assessment criteria:</p> <p>Criterion A: Unit Exam</p> <p>Criterion B: Pet Calendars- How Many and at What Price?</p> <p>A local pet shelter plans to sell pet calendar to raise money for food and other supplies. Anyone can submit pictures of his or her pets, and the public will vote for their favorites to show on the calendar.</p> <p>The cost to have 500 calendars printed is \$2,250. Research shows that people are willing to spend between \$10 and \$12 for a calendar.</p> <p>Find and compare the shelter's printing costs and sales earning.</p> <ul style="list-style-type: none"> <li>Decided on an appropriate selling price for the calendars.</li> <li>Write an equation to find the amount of money, <math>m</math>, the shelter takes in for each calendar sold, <math>c</math>.</li> <li>Show how much the shelter would take in by selling 50, 100, 150, 200, 250, 300, 350, 400, 450, and 500 calendars using a graph and a table.</li> <li>Find the numbers of calendars the shelter would need to sell to pay for the cost of printing the calendars.</li> </ul>	<p>Relationship between summative assessment task(s) and statement of inquiry:</p> <p>Student will be able to justify their choice in price for the calendar using the table and graph to show the different outcomes of the equations. Students will need to test their equation to ensure the shelter can pay for the calendars and still make a profit.</p> <p>The student will reflect and write about what went into their decision making process and how they decided on the price and number of calendars the shelter should order.</p>

**Approaches to learning (ATL)**

Collaboration Skills - Students will need to work effectively within their groups to determine a fair and equitable selling price for the calendars.

Communication Skills - Students will need to use correct mathematical notation in order to create an equation that can be used in analyzing the pet shelter's fundraiser.

**Action: Teaching and learning through inquiry**

Content	Learning process
<p>(M) 7.EE.01 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>(M) 7.EE.02 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. <i>For example, <math>a + 0.05a = 1.05a</math> means that "increase by 5%" is the same as "multiply by 1.05."</i></p> <p>(M) 7.EE.03 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. <i>For example: If a woman making \$25 an hour gets</i></p> <p><i>a 10% raise, she will make an additional <math>\frac{1}{10}</math> of her salary an hour, or \$2.50, for a new salary of</i></p>	<p><b>Learning experiences and teaching strategies</b></p> <p>Students will learn the difference between expressions and equations. They will learn how to combine like terms and use the distributive property. Games will be used in the classroom such as BINGO and relay races to help master these skills.</p> <p>Student will begin with solving one step addition and subtraction equations. They will then move onto one step multiplication and division equations. The students will then moved onto two step equations with distributive property.</p> <p>Students will create foldables to take notes and complete example problems. They will also work in pairs and share their findings.</p> <p>Students will create equations from real world word problems and solve the equations. Group work will be used so that students can work together on more difficult problems.</p> <p><b>Formative assessment</b></p> <p>Daily handouts used to assess students understanding and mastery of new content; Classroom games used to reinforce new skills; Questioning of students throughout the lesson; Unit Lesson Checks and Quizzes</p>

<p>\$27.50. If you want to place a towel bar <math>9\frac{3}{4}</math> inches long in the center of a door that is <math>27\frac{1}{2}</math> 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.</p> <p><b>(M) 7.EE.04a</b> Solve word problems leading to equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i></p> <p><b>(M) 7.EE.04b</b> Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. <i>For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.</i></p>	<p><b>Differentiation</b></p> <p>Group Activities; Peer buddies;</p> <p>Quizzes- Students with accommodations will be given multiple choice questions with one answer eliminated and for short answer problem be given a sentence starter. When appropriate, students will be given the equations to use to solve the problem.</p> <p>Summative Assessment - Lower level students will be provided with the formulas. Higher level students will not be given the formula and will have to convert numbers accordingly.</p>
<p><b>Resources</b></p>	
<p>TNReady Workbooks, Teacher created worksheets, Classroom Station Activities</p>	

### Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
<p>Students need a good understanding of operations with positive and negative numbers.</p>	<p>Throughout the unit, most students were able to successfully learn how to simplify algebraic expressions and solve one- and two- step equations using inverse operations. As expected, students struggled with solving word problems that required the creation of equations. Group activities were used to help students improve in solving word problems. And I spent several days teaching different techniques to help them learn how to create an equation that models a word problem. On the classroom assessment that measured their knowledge and understanding of working with algebraic expressions and equations, 75% of the students scored above 81.5, 50% scored above 88.5, and 25% scored above 92.5. For the 25% that did not demonstrate mastery (80 or above), the majority of the difficulty came with word problems. Solving word problems will continue to be a focus throughout the remainder of school year</p> <p>The students struggled at first with the summative assessment Pet Calendars - How Many and at What Price?. They didn't</p>	<p>Looking back on the unit, I know that it would be beneficial to spend some additional time on word problems. I will look for more group activities so that students can be grouped together in such a way as to benefit the struggling learners.</p> <p>Prior to the summative assessment Pet Calendars - How Many and at What Price? I will teach a lesson that introduces students to equations that contain 2 variables - overview of a function (input and output values).</p>

	<p>understand how to write an equation using two different variables to represent two different quantities. I had to step in and explain how an equation with two different variables can represent real-world situations. We worked several examples together and then they went back to the assessment. Most students were able to generate a correct equation. They still struggled with using the equation to determine the amount needed to cover the printing cost. Some students figured it out by guess and check and had no understanding that the equation could be solved by setting it equal to the printing costs.</p>	
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