

Lesson Plan

Lounge Grade 7 Algebraic Expressions

Standard 1.0- Knowledge of Algebra, Patterns, and Functions

Topic B: Expressions, Equations, and Inequalities

Indicator: 1. Write and evaluate expressions

Objective: b. Evaluate algebraic expressions

Clarification: The clarification is an explanation of the indicator and objective and how these math concepts appear in the puzzle.

Materials and/or Set Up: *Interactive Resource 1, Clue Cards-Set 1, Clue Cards-Set 2, Clue Cards-Set 3, Interactive Resource 2, Activity 1, Activity 2, Clue Cards-Set 4, Clue Cards-Set 5, Activity 3, Clue Cards-Set 6, Clue Cards-Set 7, Puzzle Mat, Counters (about 30 counters for each group of four students), Assessment*

Relevant Vocabulary: expression, variable, evaluate, value

Note to Teacher – Students should have attempted Levels 1 and 2 of the Lounge puzzle before this lesson is implemented. The Clue Card sets should be duplicated and cut apart before they are distributed.

In the implementation of this lesson, it is recommended that the *Interactive Resources* be projected to encourage a rich and active discussion of the math strategies and concepts.

Activities:

1. Display *Interactive Resource 1*. Facilitate a class discussion and have the students describe their strategies for determining the values of the different colored eyes.
2. Divide the students into groups of four. Distribute **Clue Cards–Set 1** to each group. Explain that each member of the group should receive one of the clue cards. Each person will be responsible for their clue as the group members work together, using the clues to determine the values of the three eyes. (*green = 1, blue = 4, pink = 2*)
3. Repeat this activity using *Clue Cards–Set 2* and *Clue Cards–Set 3*.
(*Set 2: green = 7, blue = 6, pink = 9*) (*Set 3: blue = 7, green = 4, pink = 6*)
4. Facilitate a class discussion to allow the students to share strategies they used to solve each set of clues. Have students compare the strategies used with the clue cards to strategies used to solve the Lounge puzzle.
5. Ask students to explain the differences between playing the puzzle at level 1 and at level 2. (*In level 2, the player can not use three of the same eye.*) Display *Interactive Resource 2*. Have the students continue to work in their groups to determine the value of the blue, green, and pink eyes. (*green = 6, blue = 3, pink = 1*)
6. Using *Activity 1*, have students work in pairs to complete it. (*1. blue = 5, green = 4*) (*2. blue = 4, pink = 3*) (*3. pink = 5, green = 9*)
7. Using *Activity 2*, explain to the students that the pictures of the eyes have been replaced with letters being used to represent them; B is used for the blue eye, G for the green eye, and P for the pink eye. In the last problem, an additional variable, R, is used. (*Introduce the word variable as the name given to each of these symbols (the eyes) and letters.*) Ask students: What does the word “vary” mean? (*Connect the idea that the symbols (eyes or letters) represent values which vary, or change, from problem to*

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problem.)

8. Have students complete **Activity 2** with a partner. (1. $B = 2, G = 4, P = 6$; 2. $B = 5, G = 1, P = 4$; 3. $B = 2, G = 3, P = 6, R = 1$)

Differentiation Suggestions:

- Pair students who are successful with the Lounge puzzle to complete **Clue Card – Sets 4 and 5**. (*Set 4: pink = 4, blue = 7, green = 2*) (*Set 5: green = 9, blue = 5, pink = 8*)
- Students who are excelling should complete **Activity 3** independently. ($B = 4, G = 2, P = 5, R = 3$; $B = 5, G = 7, P = 2, R = 4$; $B = 8, G = 5, P = 7, R = 4$; *Challenge: $G + G + R = 14$*)
- Allow students who are having difficulty with the Lounge Puzzle to use the **Clue Cards – Sets 6 and 7**. Provide each group a **Puzzle Mat** and a set of **counters**. The counters and the puzzle mat may be used with the “guess and check” strategy to solve the puzzle. Students should place the number of counters on each eye of the puzzle mat to represent their “guess.” They may also use counters to “evaluate” the expressions on their clue cards by showing that each expression results in the number of counters corresponding to the given value. (*Set 6: $b = 2, g = 3, p = 7$* ; *Set 7: $b = 6, g = 3, p = 4$*)

Assessment:

- Distribute the **Assessment** resource sheet.

Answers:

1. 35
2. 27
3. $B(p = 1 \text{ and } q = 2)$

Follow Up:

- Have students return to the puzzle to apply what they learned in the lesson. Ask: Did the lesson help you to clarify the math in the puzzle? How? What other strategies could you have used to help you solve the puzzle? Additionally, check student game progress through the Administrator’s Tool to determine students’ level of understanding.

- Provide the students with this scenario:

As a cashier, you need to give a customer \$0. 86. The customer requested 3 quarters for the vending machine; what other coins should you give them? Use as few coins as possible. (*1 dime and 1 penny*)

What are the other possible combinations for the number and type of coins you could

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give the customer in the above scenario? (*Accept all correct answers. Possible answers include: 3 quarters, 2 nickels, 1 penny; 2 quarters, 3 dimes, 1 nickel, 1 penny; 8 dimes, 1 nickel, 1 penny*)

In the above scenario, if you do not have any QUARTERS, what are the possibilities for giving change? (*Accept all correct answers. Possible answers include: 8 dimes, 1 nickel, 1 penny; 5 dimes, 6 nickels, 1 penny; 86 pennies*)

Real World Connection:

- Provide students with this scenario:

Jack went to Burger Barn on Monday and purchased 2 burgers and 1 soda for \$8. On Tuesday, he returned and bought 1 burger and 2 sodas for \$7. How much was each burger and each soda? (*burger price = \$3, soda price = \$2*)

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Interactive Resource 1



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Clue Cards – Set 1

$$\text{Pink Cell} + \text{Green Cell} = 3$$

$$2 \times \text{Green Cell} = \text{Pink Cell}$$

$$\text{Pink Cell} + \text{Blue Cell} = 6$$

$$\text{Blue Cell} = 4$$

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Clue Cards – Set 2

$$\text{Blue Circle} + \text{Green Circle} = 13$$

$$\text{Pink Circle} + \text{Green Circle} = 16$$

$$\text{Pink Circle} + \text{Blue Circle} = 15$$

$$\text{Blue Circle} + \text{Blue Circle} = 12$$

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Clue Cards – Set 3

$$\text{Blue Cell} + \text{Blue Cell} + \text{Blue Cell} = 21$$

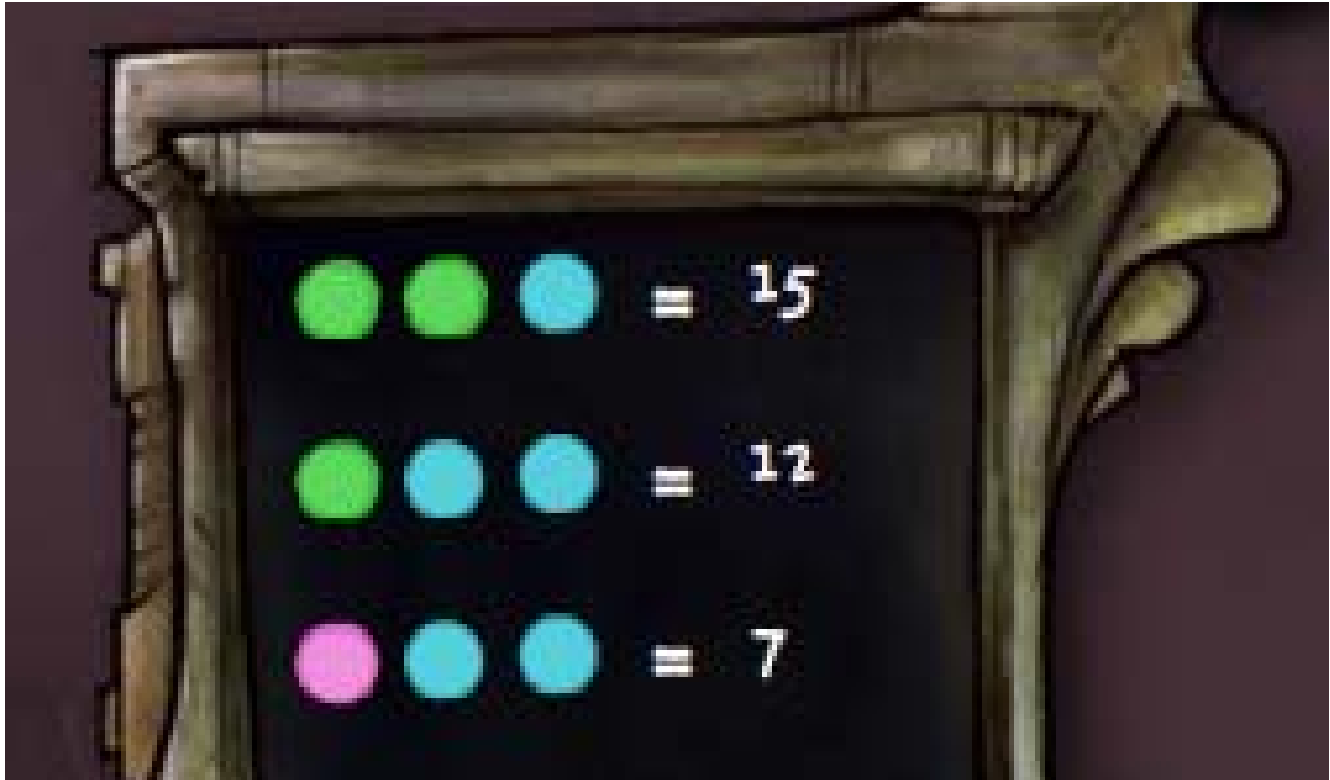
$$\text{Blue Cell} + \text{Green Cell} + \text{Green Cell} = 15$$

$$\text{Blue Cell} + \text{Green Cell} + \text{Purple Cell} = 17$$

$$\text{Green Cell} + \text{Purple Cell} + \text{Purple Cell} = 16$$









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Interactive Resource 2











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Activity 1

1.  +  +  = 13
 +  +  = 14
 = _____  = _____

2.  +  +  = 11
 +  +  = 10
 = _____  = _____

3.  +  +  = 19
 +  +  = 23
 = _____  = _____

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Activity 2

1. $B + B + B = 6$

$$G + B + G = 10$$

$$P + G + G = 14$$

$$P + G + B = 12$$

VALUES: $B =$; $G =$; $P =$

2. $B + B + G = 11$

$$G + G + B = 7$$

$$G + G + P = 6$$

$$P + G + B = 10$$

VALUES: $B =$; $G =$; $P =$

3. $P + G + G = 12$

$$G + P + B = 11$$

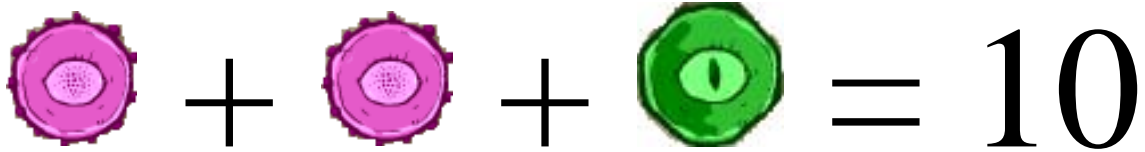
$$B + B + G = 7$$

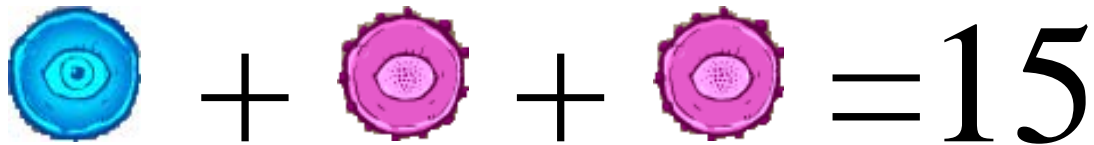
$$G + P + R = 10$$

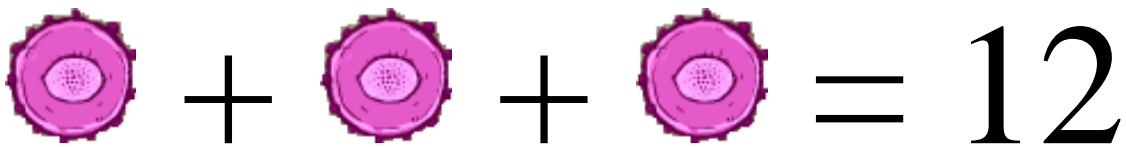
VALUES: $B =$; $G =$; $P =$; $R =$

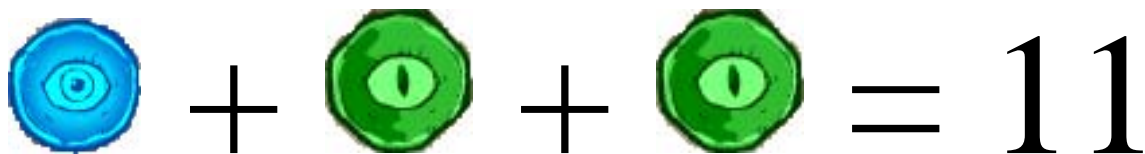
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Clue Cards – Set 4


$$\text{Purple Cell} + \text{Purple Cell} + \text{Green Cell} = 10$$


$$\text{Blue Cell} + \text{Purple Cell} + \text{Purple Cell} = 15$$


$$\text{Purple Cell} + \text{Purple Cell} + \text{Purple Cell} = 12$$


$$\text{Blue Cell} + \text{Green Cell} + \text{Green Cell} = 11$$

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Clue Cards – Set 5

$$\text{Pink Cell} + \text{Green Cell} + \text{Green Cell} = 26$$

$$\text{Blue Cell} + \text{Green Cell} + \text{Green Cell} = 23$$

$$\text{Pink Cell} + \text{Pink Cell} + \text{Blue Cell} = 21$$

$$\text{Blue Cell} + \text{Green Cell} + \text{Pink Cell} = 22$$

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Activity 3

1. $B + B + G = 10$

$$B + B + P = 13$$

$$B + P + G = 11$$

$$G + G + R = 7$$

VALUES: $B =$; $G =$; $P =$; $R =$

2. $G + P + P = 11$

$$B + P + P = 9$$

$$G + B + B = 17$$

$$B + B + R = 14$$

VALUES: $B =$; $G =$; $P =$; $R =$

3. $P + G + B = 20$

$$P + B + B = 23$$

$$P + G + G = 17$$

$$B + P + R = 19$$

VALUES: $B =$; $G =$; $P =$; $R =$

Challenge: Write an expression that produces a final value of 14.

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Clue Cards – Set 6

$$\text{Blue Circle} + \text{Green Hexagon} = 5$$

$$\text{Blue Circle} + \text{Pink Star} = 9$$


$$\text{Pink Star} + \text{Green Hexagon} = 10$$


$$\text{Pink Star} + \text{Pink Star} = 14$$


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Clue Cards – Set 7


$$\text{Green Octagon} + \text{Green Octagon} + \text{Green Octagon} = 9$$


$$\text{Green Octagon} + \text{Green Octagon} + \text{Blue Circle} = 12$$

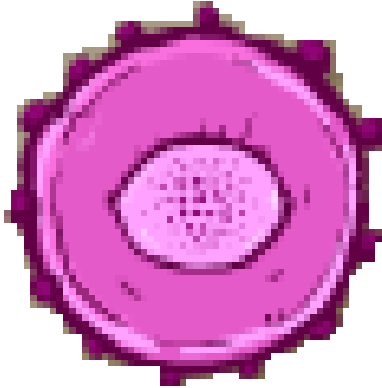

$$\text{Green Octagon} + \text{Pink Circle} + \text{Pink Circle} = 11$$


$$\text{Green Octagon} + \text{Pink Circle} + \text{Blue Circle} = 13$$

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Puzzle Mat

Pink



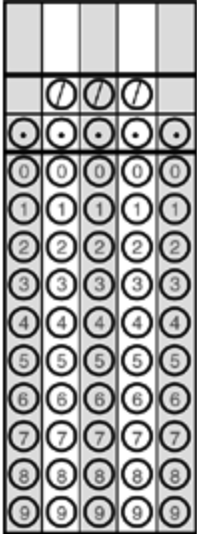
Green



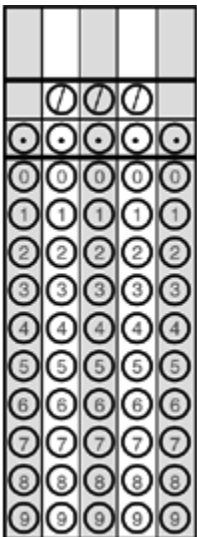
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Assessment

1. What is the value of the expression $8x + 3$ when x is 4?



2. If $a = 5$, evaluate the expression $8 + 3a$.



3. If the expression $p + q + q$ has a value of 5, which of the following could be the values of p and q ?
- A. $p = 1$ and $q = 5$
 - B. $p = 1$ and $q = 2$
 - C. $p = 2$ and $q = 1$
 - D. $p = 3$ and $q = 2$