Math Investigation Centers

2nd Grade ~ Unit 3 – Basic Facts and Relationships

Math and Logic

How Many:
How many arrays can you create with a roll of the dice?

Math and Logic

Pyramid 10:
Play a fun math game by making combinations to ten.

Student Choice

Math and Problem Solving

Who is Right:
Tim, Sam, and John are triplets who love to argue. They always argue until one would prove the other two wrong. This time they're stuck and need your help.

Math and Literature

The Queen's Dilemma:
The queen of a Bug Colony is attempting to organize her bugs in arrays and she needs your help.

Math Investigation Center

How Many

Unit of Study 3

Core Correlation: 2.OA.4

DOK: 2; **Proficiency Level**: 4

Type of Activity: Math and Logic

Materials: centimeter cubes, two 1-6 dice, How Many Recording Sheet, pencil, and crayons

Introduction: How many arrays can you create with a roll of the dice?

Instructions:

1. Each player uses a different 10 × 10 grid on the How Many Recording Sheet.

2. Players take turns. On your turn, roll the dice to determine the two numbers to use in your array.

3. Arrange the centimeter cubes into a rectangular array. The first number represents the number of rows, and the second number represents the number in each row. (*My numbers are ___ and ___. I can build an array that has ___ rows with ___ cubes in each row)*

4. Draw the array on your grid and record the repeated addition equation inside the array.

   For example, if a player rolls a 4 and 6, he/she would build a rectangular array that has 4 rows with 6 cubes in each row, records 6 + 6 + 6 + 6 = 24 inside the array.

5. The game ends when a player is unable to place an array on the grid. Each player counts how many of their squares are covered and how many are uncovered. The winner is the player who has the most covered, or uncovered as determined by the teacher.

Extension: Each player uses notebook-sized centimeter squared paper. Use 1-9 dice.

Assessment:

Grade will be determined by the following:

- Completion of How Many Recording Sheet

How Many?

Recording Sheet

Player 1

Name: _____

Covered   _____

Uncovered _____

Player 2

Name: _____

Covered   _____

Uncovered _____

Math Investigation Center
Pyramid 10
Unit of Study 3

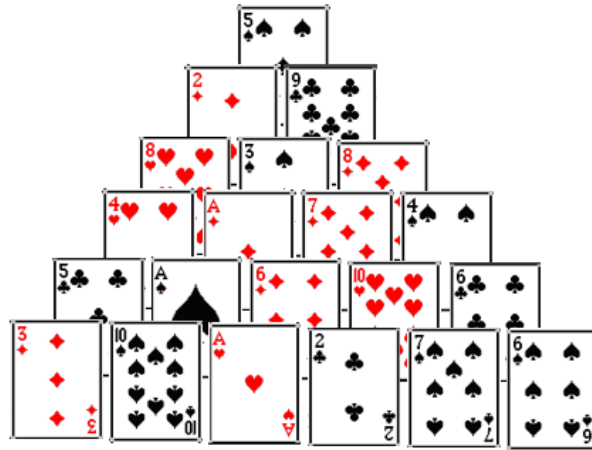**Core Correlation:** 2.OA.2

DOK: 2; **Proficiency Level:** 4

Type of Activity: Math and Logic

**Materials:** One deck of playing cards, with face cards removed

**Introduction:** Play a fun math game by making combinations to ten.

Instructions:

- Shuffle the deck of cards.
- Arrange your cards into a pyramid with six rows as shown below. Each row will slightly overlap the previous row.

- Put the rest of the deck off to the side, face down.
- The goal is to remove cards in the pyramid by "making ten" with two cards (or removing a ten card).
- You can only remove cards that do not have any cards overlapping it. At the start of the game, you can only use the bottom row of the pyramid to make ten. For example, in the pyramid above, you can remove the seven and three to make ten and a ten card. Set these cards aside, out of play.
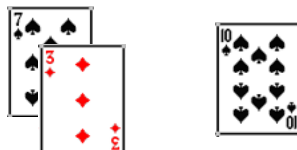
- At this point, all that is available is a five, an ace, a two and a six. No two cards remaining can make ten. When there are no other options, turn over one card from the deck of cards that had been set aside.
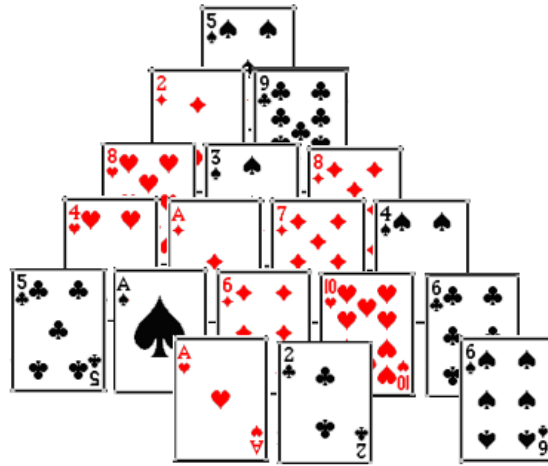
- If the card is a ten or can be combined to make ten with a free card from the pyramid (a card that does not have cards overlapping it), then remove the cards and set them aside.
- If you can't use the card that you have turned up, then continue to draw until you can make another ten.
- The game is over when you have turned over all the cards in your deck and you can't make and remove any more tens.
- Once you are stuck and can no longer remove any more cards, add the value of the remaining cards to determine the score. Record the score on the Pyramid 10 Recording Sheet. In the example below, the score would be 5 + 2 + 8 + 4 = 19
- Play this game 3 more times.
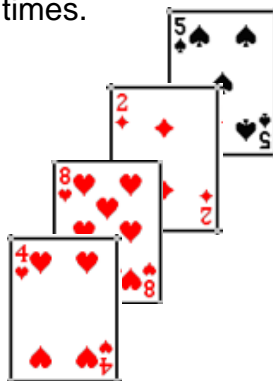
Extension: Use the Jack to represent 11. Arrange your cards into a pyramid with seven rows. Remove cards from the pyramid by making eleven with two cards.

Assessment:

Grade will be determined by the following:

- Pyramid 10 Recording Sheet

Pyramid 10

Recording Sheet

Name: _____

List all of the different sums of 10 you can get using the numbers 1 – 9.

Game 1 Score: _____

Game 2 Score: _____

Game 3 Score: _____

Game 4 Score: _____

Math Investigation Center
Who's Right?
Unit of Study 3

Core Correlation: 2.OA.4

DOK: 3: **Proficiency Level:** 4

Type of Activity: Math and Problem Solving

Materials: pencil, Who's Right Recording Sheet, Who's Right Grid Paper, crayons or colored pencils

Introduction: Tim, Sam, and John are triplets who love to argue. They always argue until one would prove the other two wrong. This time they're stuck and need your help.

Instructions:

- Tim says every number (0 to 25) can be represented in an array that has two or more rows.
- Sam says you can make an array with two or more rows for fewer than 16 of the numbers (0 to 25).
- John says you can make an array with two or more rows for more than 16 of the numbers (0 to 25).

Who is right? If you know a brother is wrong, you need to prove it to them using numbers, pictures and words to show your thinking.

Assessment:

Grade will be determined by the following:
- Completion of Who's Right Recording Sheet
- Answer to questions

Who's Right
Recording Sheet

Name: _____

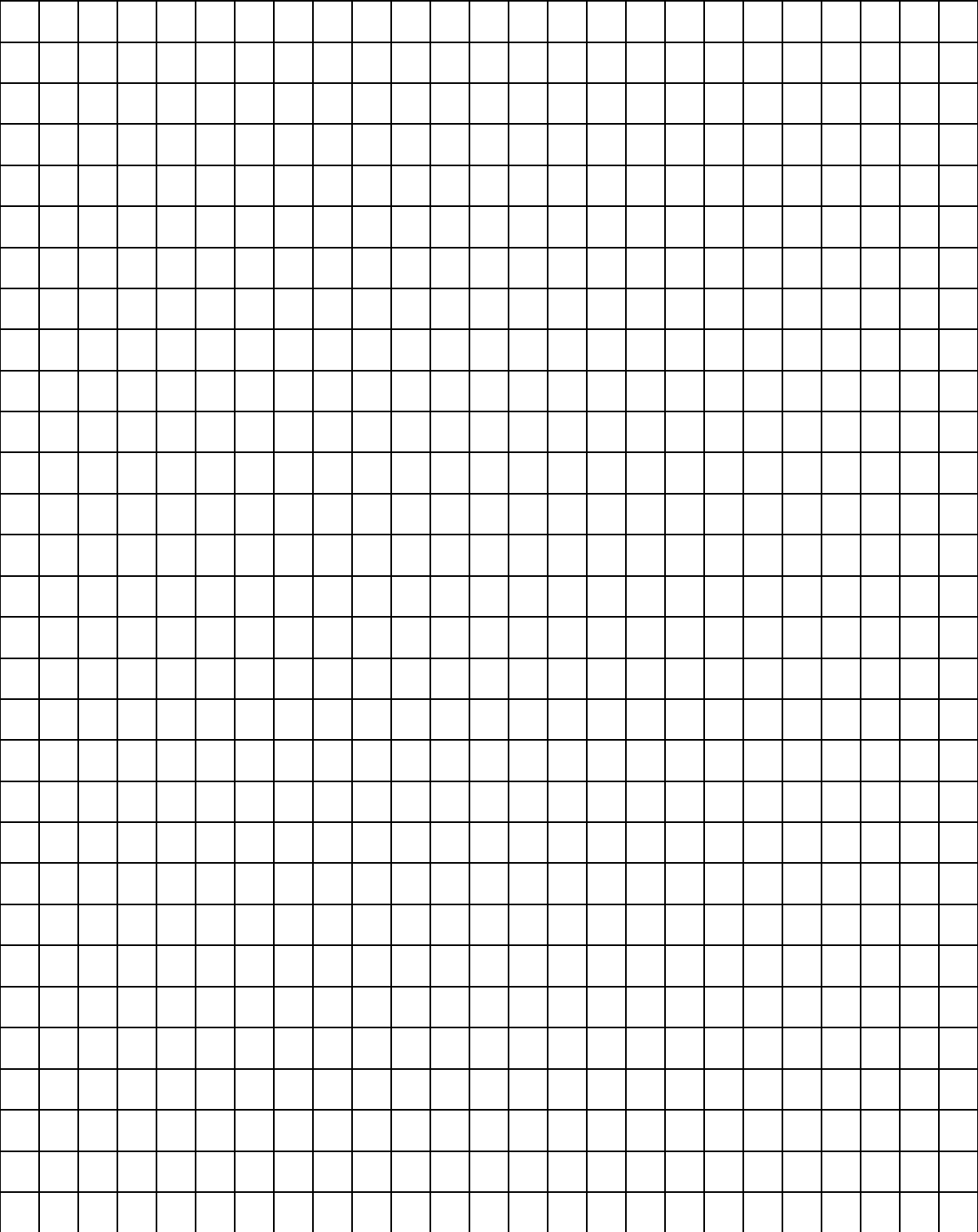Write the repeated addition sentence for the numbers that can be modeled in an array with 2 or more rows.

	Equation
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

	Equation
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

What do all of the numbers that have an array with 2 or more rows have in common?

Who's Right

Grid Paper

Math Investigation Center
The Queen's Dilemma
Unit of Study 3

Core Correlation: 2.OA.4

DOK: 3; **Proficiency Level:** 4

Type of Activity: Math and Literature

Materials: A Remainder of One by Elinor J. Pinzces, pencil, The Queen's Dilemma Record Sheet, The Queen Dilemma's Grid Paper, crayons or colored pencils

Introduction: The queen of a Bug Colony is attempting to organize her bugs in arrays and she needs your help.

Instructions:

- Read or listen to the story, Remainder of One by Elinor J. Pinzces.
  https://www.youtube.com/watch?v=arT7OSEdu3U
- The queen of the Bug Colony has 16 bugs in her army. She is attempting to organize her bugs into arrays. She wants to know how many arrays she can create using her 16 bugs. Use manipulatives, and record your work on the Queen's Dilemma Recording Sheet.
- Use the numbers 4 – 15 and create as many arrays of bugs for each number as you can. Look for patterns in the arrays.
  - Which number of bugs only march in single file?
  - Which number of bugs walk in an even number of rows?
  - Which number of bugs walk in an odd number of rows?
  - Do any of the number of bugs have both even and odd equal of rows?
  - Which number of bugs can create a square array?

Assessment:

Grade will be determined by the following:
- Completion of Queen's Dilemma Recording Sheets

The Queen's Dilemma

Recording Sheet (page 1)

Name: _____

Number of Ants	Number of Arrays Created	Repeated Addition Equations	Number of Ants	Arrays	Repeated Addition Equation
4			11		
5			12		
6			13		
7			14		
8			15		
9			16		
10					

The Queen's Dilemma
Recording Sheet (page 2)

Name: _____

1. Which number of bugs only march in single file?

2. Which number of bugs walk in an even number of rows?

3. Which number of bugs walk in an odd number of rows?

4. Do any of the number of bugs have both even and odd equal of rows?

5. Which number of bugs can create a square array?

The Queen's Dilemma

Grid Paper