RAFT IDEAS

Topics: Venn Diagrams, Math Terminology

Materials List

- ✓ Blank playing cards, 1 deck
- ✓ Bottle caps, green or purple preferred, 15 or more per player,
- ✓ Tokens, green or purple preferred, 10 per player
- ✓ Permanent marker
- ✓ My Grapes of Math Vine, page 3, 1 per player

This activity can be used to teach:
Common Core Math Standards:

- Numerical patterns using given rules (Grade 5, Operations and Algebraic Thinking, 3);
- Solving equations and inequalities (Grade 6, Expressions and Equations, 5),
- Problem Solving and Reasoning (Mathematical Practices Grades 3-9)

raft resource area for teaching
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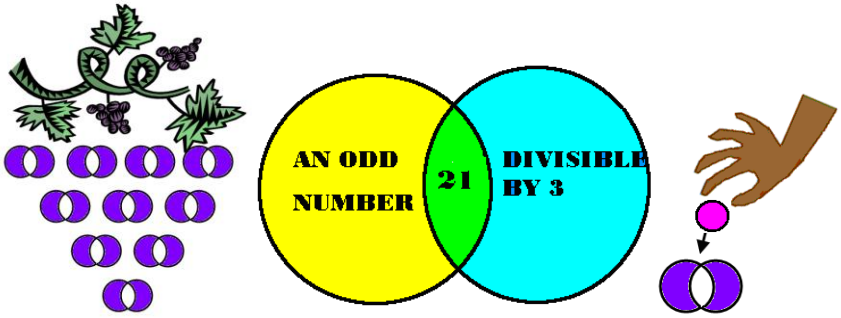
The Grapes of Math!

Gather the most pairs of Venn Diagram matches on the Vine!



Locate the most values satisfying two mathematical conditions in a Venn Diagram scenario to gain a reward "grape". The player with the most grapes wins!

Assembly

1. Choose categories and types of numbers coordinated to the students' grade level and abilities. See sample categories and numbers on page 2.
2. Create "category cards": use permanent marker to write a category on each card.
3. Create "number caps": use permanent marker to write a number on each cap.

Playing the Game (for 2 – 4 players)

1. Shuffle cards and place deck face down between players.
2. Pass out 10 tokens and a "My Grapes of Math Vine" chart to each player.
3. Put all number caps in the center, top down so no numbers show.
4. Each player picks one cap. The player with the highest number starts. Play continues clockwise. Place all caps back in the center.
5. Each player takes 15 number caps without looking at the numbers.
6. The first player draws and reveals the top 2 cards to all players. Each player searches among their number caps for numbers satisfying both conditions on the cards. For example:
   - The first 2 cards read: "An odd number", and "Divisible by 3".
   - Players find all number caps that satisfy both cards. For instance, a cap with a "21" would work, while "12" would not work.
   - The player with the most caps that satisfy the intersection of the 2 category cards wins the round. The winner puts a token on the center of a pair of grapes from their "My Grapes of Math Vine" chart. If 2 players tie, both get a token.
   - The next player draws 2 new cards and play continues for a new round.
7. If a pair of category cards have nothing in common (the null set), then each player receives a "wild card" token.
8. If no player has a cap to match a possible category card situation, then no tokens are earned and play continues with the draw of a new pair of category cards.
9. The game ends when a player has a token for each grape pair on their chart or time is called!

The Math Behind the Activity

The capability to think logically is needed in every discipline, and it is particularly important in mathematics. John Venn (August 4, 1834 - April 4, 1923) was an English

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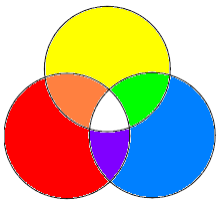
mathematician/logician who invented the Venn diagram. Venn Diagrams show how various sets of information are related, and are a visual tool for reasoning deductively. In this RAFT activity, a Venn diagram is represented by two intersecting circles. Each circle represents one category card. The area where the circles intersect represents information that both cards have in common. Venn diagrams can include more than two areas, and can be represented by a variety of shapes. The universal set contains all elements of a problem under consideration and the circles, or other shapes, represent subsets of the universal set. The opposite of the universal set is the null, or the empty, set.

Taking it Further

- Flip a coin each round; heads means "and" both categories are true; tails means "or" one category is true.
- Play the game with 3 intersecting circles, choosing 3 cards and satisfying all 3 conditions on the cards.



Web Resources (Visit www.raft.net/raft-idea?isid=642 for more resources!)

- Venn diagrams and logic - http://illuminations.nctm.org/LessonDetail.aspx?id=L384
- Venn diagram factor example - http://illuminations.nctm.org/LessonDetail.aspx?id=L274
- Venn diagram with polygons - http://mail.nppsd.org:8080/~mckinley/FOV1-00031D7D/Illuminations/lessonplans/6-8/polysort/index.html

Sample numbers for number caps:

Integers; –9, –5, 1, 4, 66, 134
Whole numbers: 0, 1, 2, 3, …..
Counting numbers: 1, 2, 3, ….
Rational numbers: – ½, ½, 2, 4/11, 5/6, 7.
Prime numbers: 2, 3, 5, 7, 11, 13, ...
Irrational numbers: $\sqrt{2}$, $\sqrt{3}$, π, e, $\sin(10^{o})$
A Pythagorean triple: for example 3, 4, 5 or 5, 12, 13
An Improper fraction: 4/3, 6/5, 14/9, 1 ½, 3 ¾.

Odd numbers: –3, 5, –9, 9, ….
Even numbers: …, –2, –4, 2, 4, 6, 8, ….
Perfect Squares: 4, 25, 64, 100, …
Perfect Cubes: 8, 27, 64, …
Composite numbers: 4, 6, 8, 55, 36, ...
Decimal numbers: 0.23, – 1.67, ...
A proper fraction: ½, 2/3, 4/7, ...

Sample categories for category cards:

Multiples of 4
Even numbers
Odd Numbers
A Counting number
Perfect Squares
Perfect Cubes
Divisible by 5
A Prime Number
Integers divisible by 3
An irrational number
Decimal numbers
A Proper Fraction
An Improper Fraction
Less than one
Between 4 and 10
A number that is equal to ½
A number that divides evenly into 4

Factors of 36
A multiple of 9
A Multiple of the reciprocal of ½
A number divisible by the number of edges on a hexagon
A number that is a multiple of the number of vertices on a cube
A number that divides evenly into the number of degrees in a triangle
One of a Pythagorean Triple
A Composite Number
Added to 7 equals 36
A rational number
When multiplied by 5 is a whole number
When multiplied by 7 is a number less than 390
A number between 15 and 44
Greater than ¾
A fraction with a numerator of 3
A number between 2 and 5 ½
A number divided by 2 results in another number less than 35

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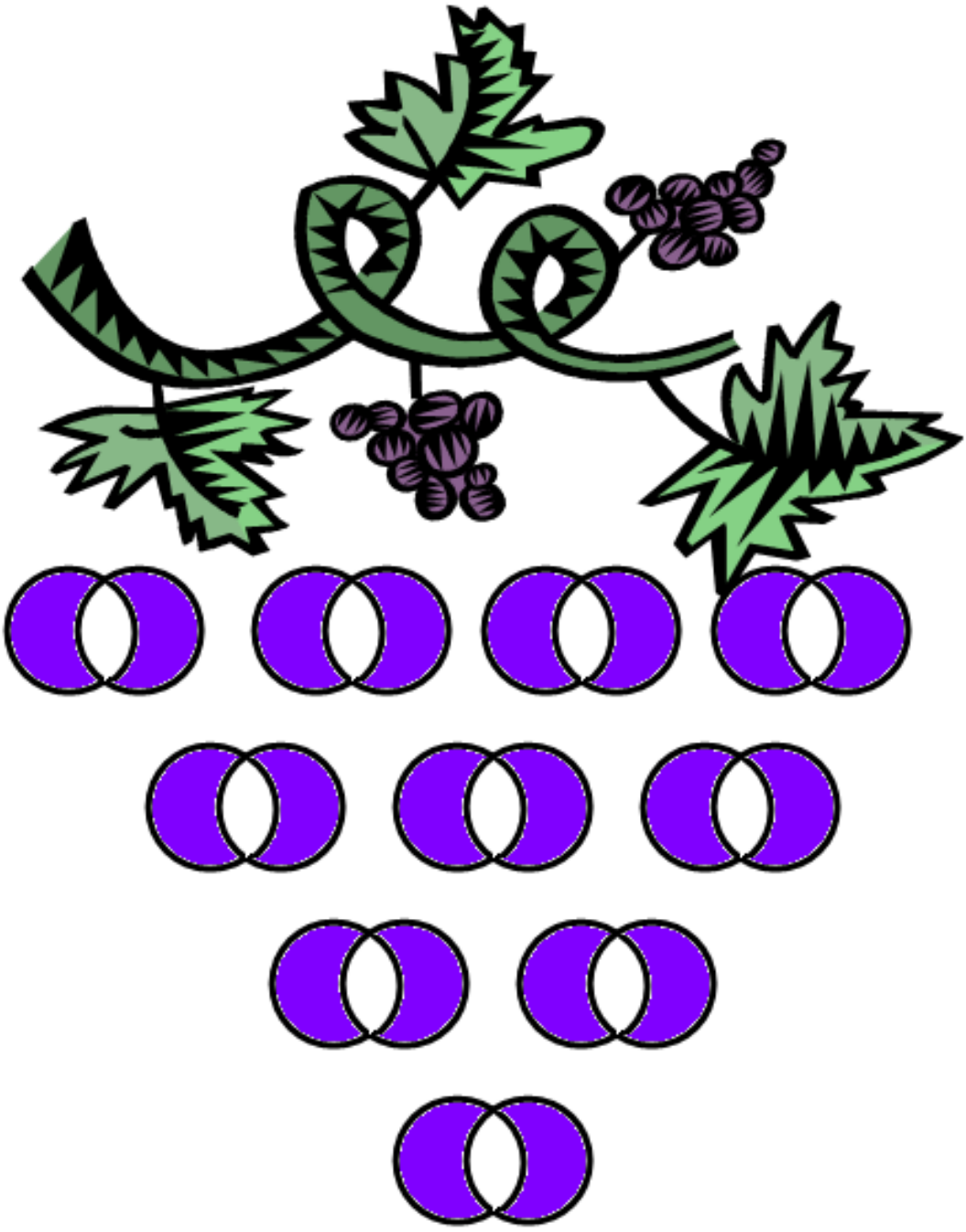
My Grapes of Math Vine!



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