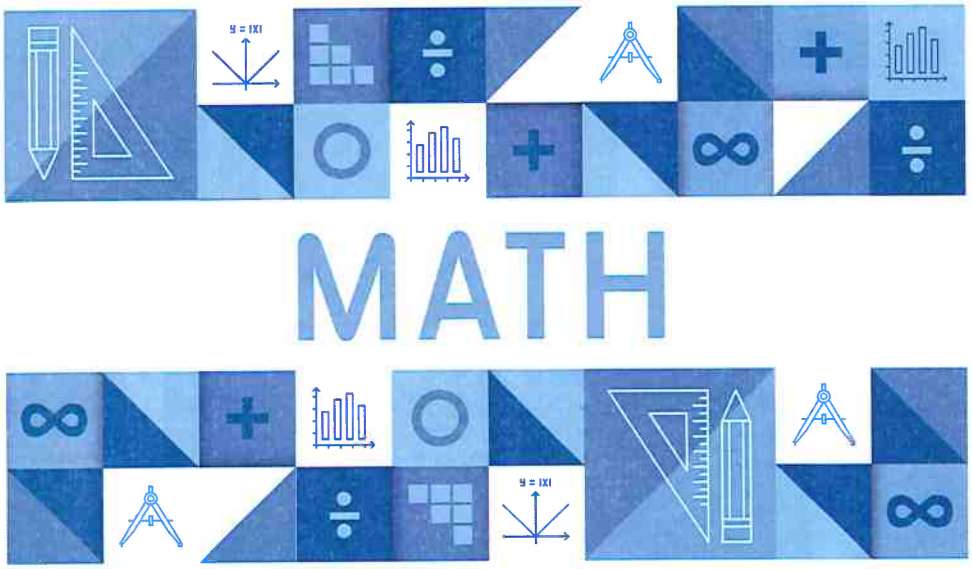

greater cincinnati stem collaborative
SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH

Welcome to your deck of Family STEM Cards! These cards are meant to be a way for the whole family to get involved in STEM and see that STEM happens everywhere!

HOW THEY WORK:
There are four "suits" of cards, just like a normal deck. In each suit you will find a different theme of activities – science, technology, engineering, or math

A-4 CARDS
students Pre-K - 2nd grade

5-9 CARDS
students 3rd - 5th grade

10- K CARDS
students 6th grade and older

Let us know what you think of them by contacting us and include pictures!

A TANGRAMS

MATERIALS:
- construction paper
- scissors
- ruler
- pencil

ACTIVITY:
Create tangrams to make pictures out of geometric shapes.

STEPS:
1. Using the materials create a variety of shapes (triangles, squares, rectangles) at least 4 of each.
2. Together pick a theme (space, ocean, outdoors, etc).
3. Each person should pick an object/thing within the theme (rocket, alien, UFO, etc).
4. Work together to create each person's object out of tangrams. *You could also Google tangram outlines and use those!*

ENDING QUESTION:
What shapes were you not able to make with the tangrams?

DIVE DEEPER!
When you are creating your shapes, talk about the properties of each shape. How many sides, edges, vertices are there?

A

2 MATH MEMORY

MATERIALS:
- paper
- scissors
- marker

ACTIVITY:
Solve math problems while playing the memory game.

STEPS:
1. Decide how big you want your game board to be (5x5 - 9x9).
2. Fold your paper in half, on one side write an addition or subtraction problem, on the other side write the answer to create "cards".
3. Create as many problems as you need for your board. Cut out the "cards".
4. Place "cards" face down.
5. Take turns flipping over 2 cards at a time trying to find the matching problem and answer. *The person with the most matches wins!*

ENDING QUESTION:
What was the most difficult part of this game?

TOO EASY?
You can make the game harder by adding multiplication and division problems.

2

3 RACE TO A DOLLAR

MATERIALS:
- bag of coins
- 1 die

ACTIVITY:
Collect pennies and trade them for other coins to reach a dollar.

STEPS:
1. Roll the die and collect that many pennies.
2. Pass the die to each player.
3. At the beginning of your turn you can trade pennies for other ex. 5 pennies for a nickel).
4. Before each roll announce how much money you have. *Take turns until someone reaches a dollar*

ENDING QUESTION:
How could you adjust the game to play with dollar bills?

FUN FACT!
A numismatist is someone who studies and collects things that are used as money!

3

4 ROLL THE DICE

MATERIALS:
- pencil
- dice
- paper
- coin

ACTIVITY:
Practice addition and subtraction.

STEPS:
1. Assign addition and subtraction to the heads and tails of the coin.
2. Roll both dice, flip the coin.
3. Use the numbers of the dice and the coin to create a problem and solve on paper.
4. Pass to the next player and repeat *After 10 rounds, add together the answers of each problem, the player with the largest sum wins!*

Modifications:
Use 4 dice: *2 dice are tens place 2 dice are the ones place. Practice adding and subtracting double digit numbers.*
Use 2 coins: *1 coin is for addition and subtraction, 1 coin is for multiplication and division. Create two problems per turn.*

HINT!
Don't have dice at your house? You can make some! Make a cube out of paper and add the dots. You could even make dice with higher numbers!

4

5 AREA GAME

MATERIALS:
- graph paper
- 2 markers
- 2 dice

STEPS:
1. Divide the graph paper in half hamburger style.
2. Player one takes both dice and rolls them, one die is the width of the rectangle, the other is the length.
3. Player one draws a rectangle of those dimensions on their side of the board and writes the area inside.
4. Each player repeats steps 2 and 3, placing the new rectangles wherever they'd like on their side. Rectangles cannot overlap. *The player to fill up the most area wins!*

ENDING QUESTION:
How does the placement of your rectangles matter in this game?

GO FURTHER!
To find area, you multiply the length by the width. Try a game where you have to find the perimeter of each rectangle too!

5

6 TASTE THE MATH

MATERIALS:
- cereal/candies
- paper

ACTIVITY:
Using arrays to visualize multiplication.

STEPS:
1. Have two people say a number between 1-10.
2. Use the two numbers to make an array with the cereal/candy.
3. On the paper write the multiplication problem, repeated addition, and answer.
4. Repeat until you can't make any more arrays or resist eating the cereal/candy.

ENDING QUESTION:
What are some of the patterns you saw in your arrays?

TIP!
Arrays show that multiplication is repeated addition. 4 x 3 is four rows of three or 3+3+3+3.

6

7 LACY PLATES

MATERIALS:
- paper plates
- hole punch
- tape
- marker
- string/yarn

STEPS:
1. Punch 10 holes on the rim of the plate.
2. In the center write the number you want to skip count by (ex. 2).
3. At each hole write the numbers randomly (ex. 2,12,8,20,18, etc).
4. Starting with the smallest number, skip count and thread the string through the correctly numbered hole.
5. Tape the string in place at the starting number and mark the path on the back of the plate.
6. Unlace the plate and use it to practice skip counting! *Make as many lacy plates as you want!*

ENDING QUESTION:
Ending Question: How does skip counting relate to multiplication?

EXTEND THE ACTIVITY!
You can punch as many holes in the plate as you want to practice counting higher.

8 BOWLING FOR GRAPHS

MATERIALS:
- 20 plastic cups
- paper
- markers
- tape
- ball

ACTIVITY:
Create a graph based on how many cups are knocked down.

STEPS:
1. Tape 2 cups together where the mouths meet. Continue until you have 10 "pins".
2. Set up "pins" in the same way bowling pins are set up.
3. Stand at least 10 ft away and use the ball to "bowl".
4. Use the paper and marker to record how many pins are knocked down.
5. After each person takes 10 turns, create a bar graph to show which number of pins was knocked down the most.

ENDING QUESTION:
What other graphs could you make to show data collected?

TIP!
If you don't have that many plastic cups, search around your house for other items you could use as pins.

9 FACTOR GAME

MATERIALS:
- 2 different colored writing utensils
- paper

ACTIVITY:
Determine the factors of numbers when multiplied.

STEPS:
1. On the paper write the numbers 1-30.
2. Player 1 chooses a number and marks it with a circle.
3. Player 2 then marks all remaining factors of Player 1's number with a square.
4. Player 2 then chooses a number. Player 1 marks remaining factors.
5. Repeat until are numbers have a mark.

Scoring: *Player choosing the number receives points equal to the number they choose (i.e. 21 = 21 points). Player marking factors gets points equal to all of the remaining factors (i.e. 3 + 7 = 10 points).*

ENDING QUESTION:
Why do some numbers have more factors than others?

HINT!
A factor is a number you multiply to get another number. 2 x 3 = 6, the factors of this equation are 2 and 3.

10 SWEET FRACTIONS, DECIMALS AND PERCENTAGES

MATERIALS:
- 1 pack of Skittles or M&Ms
- crayons/colored pencils
- paper
- pencil

ACTIVITY:
Determine the fraction, decimal and percentages for each color of candy.

STEPS:
1. Pour 20 candies out of the bag and separate by color, assign each family member a color.
2. On the paper, create a section for each color and label.
3. Starting with the first color, count the number of candies and write a fraction.
4. Calculate the fraction as a decimal.
5. Turn the decimal into a percentage.
6. Calculate the number back into a fraction. *Repeat steps 3-6 with each color.*

ENDING QUESTION:
What is a graph you could make using the data collected?

TIPS!
Fraction to decimal - divide the numerator by the denominator. Decimal to percent - move the decimal two places right. Percent to fraction - put the percent over 100 and simplify.

J BLOCKO

MATERIALS:
- paper
- 12 Legos (or other small object) per player
- pencil
- 2 dice

ACTIVITY:
Explore experimental probability.

STEPS:
1. Create a game board with 11 columns numbered 2-12.
2. Give each player 12 Legos and place them on any number (you can place more than one on a number).
3. Roll two dice and announce the sum of the dice.
4. If there is a Lego under that number on the game board it is removed (only one at a time).
5. Make a tally for each sum rolled. *The first player to remove all their Leogs wins!*

ENDING QUESTION:
Using the tallies on the game board, what was the experimental probability of rolling each sum?

HINT!
Experimental probability is the ratio of the number of times an event occurs to the number of trials the event was repeated for.

Q DEAL OR NO DEAL?

MATERIALS:
- Store ads
- pencil
- paper
- glue

ACTIVITY:
Finding the unit price of items to determine the best value.

STEPS:
1. Pick an item and gather 6-10 different prices.
2. Label your paper "picture", "unit price" and "best deal".
3. Glue the pictures and price of items in the first section.
4. In the second section, determine the unit price by putting the price over the unit.
5. Complete for each pictured item.
6. After, determine the best deal and mark it. *Remember, if your items aren't in the same unit you will need to convert (i.e. cups and oz).*

ENDING QUESTION:
What unit price would be the most helpful for your family to know?

TIP!
If you don't have any paper ads at your house you can use a grocery store app or online store.

K STAINED GLASS

MATERIALS:
- graph paper
- markers
- ruler

ACTIVITY:
Graph linear equations by solving for coordinate points.

STEPS:
1. Prep the graph paper by creating an X,Y axis in the middle (use both positive and negative numbers).
2. Create twelve linear equations.
3. Solve each linear equation by selecting at least 3 values.
4. After solving each equation, plot the coordinate points.
5. Use the ruler to create your lines, color in between the lines to create the stained glass.

ENDING QUESTION:
How does changing your equations adjust how your lines plot?

HINT!
y= 2x +1, 5x = 6+ 3y, y/2 = 3 -x are all examples of linear equations.

greater cincinnati STEM collaborative

The Greater Cincinnati STEM Collaborative (GCSC) is the backbone K-12 STEM education nonprofit on a mission to create a robust STEM pipeline of diverse talent to meet the accelerating demands for STEM jobs in our regions. GCSC connects business, education, and community partners together to create hands-on learning experiences which prepare students to be the innovators and problem solvers of tomorrow.

In collaboration with schools and educators, GCSC supports the following programs:

- 3d Printers Club
- STEM Bicycle Club
- Summer of STEM
- Garden Engineers
- Game On!

To learn more about GCSC and how you can get involved, visit us at:

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