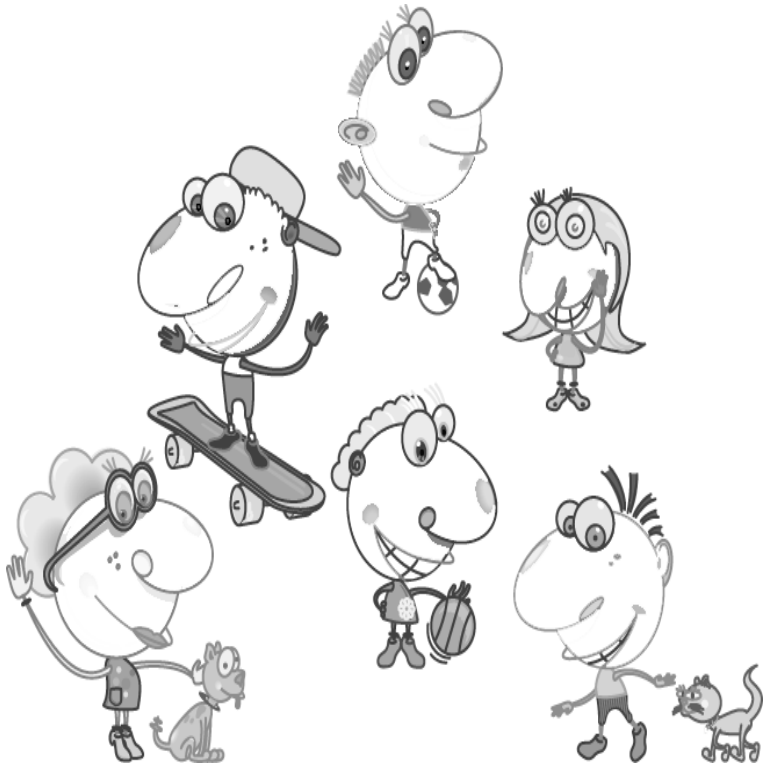
FAMILY MATH NIGHT
Rollingwood Elementary School
Thursday, January 14, 2009



Mathematics is not
a spectator sport.
In order to learn ,
you've got to be an
active member
of the team.

Family Involvement Is Important

You can make a difference!

Studies show when there is a high level of family involvement students do better in school.

Get involved!

Be Supportive

- Maybe you weren't good at math, but your kid doesn't have to know that. Have a good attitude and she/he will, too.

- "My daughter is growing up with a 'can do' attitude toward math. Her skills are more advanced than mine, and I let her know I'm proud of her."

Listen

- It may be only a few minutes a day, but I'll sit down with my grandson and ask him what math he's working on. Sometimes by explaining it to me, it becomes clearer to him.

- From talking with my daughter, I've begun to see math in an entirely new way. She likes taking the lead, and I'm sure that teaching me helps reinforce what she's learned.

Parents are the Most Important Teachers

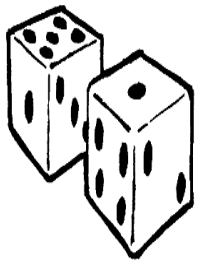
- Read To and With Your Child
- Talk about Mathematics
- Provide activities that make math fun
- Model how to solve problems
- Make the most of captured time
- Be positive about math!

Connect Math to Daily Life

- Try estimation activities
  - How tall is that building?
  - How many ducks are in the pond?
- While traveling in your car create new math problems, like measuring time to travel to visit Grandma.
- Talk about math while cooking and shopping, with measurements, quantities, weights, and how much something costs.

Use Manipulatives

- Beans, blocks, candy almost anything can be used for solving problems
- Others may include:
  - Spinners
  - Dice
  - Counters
  - Base Ten Blocks
  - Tangrams



"You and Your Home" Game Show

- Family Members can participate individually or you can form teams.
- Sample Questions:
  - How many windows are in your home?
  - How long is your bed?
  - What is the area of your bedroom?
  - How many cookies are in the cookie jar?
- Prizes
  - No chores for the day
  - A special movie night for the family
  - An afternoon at the park

Addition or Multiplication War

- A deck of cards can be used for an addition or multiplication war game.
- The dealer passes out all the cards. Players don't look at their cards.
- Each player turns up two cards.
- In Addition War, the highest sum wins the hand.
- In Multiplication War, the highest product wins the hand.
- Play continues until one player has no more cards.

Make Wrapping Paper

- Younger Children Learn About Patterns
- Large Piece of White Paper, Ruler, Pencil, Sponges Cut in 2 Shapes, and 2 Colors of Washable Paint in separate containers.
- Choose a shape--square or triangle.
- Using the ruler make a grid of your shape all across the Large Piece of White Paper.
- Using the sponges and paints, make a pattern on your paper.

MATH NIGHT ACTIVITIES

EGG CARTON TREASURE #1

- Take One Egg Carton with Numbers Written In Each Slot
- Take a Cup Of Beans
- Put Beans in Each Slot To Match The Number On The Slot
  - For example, in the slot labeled 2, put in 2 beans
- When you are finished, all the beans in the cup should be in the Egg Carton.
- Make sure you count carefully so you do not miss any!

EGG CARTON TREASURE #2

- Take One Egg Carton with Numbers Written In Each Slot
- Take a Cup Of Beans
- Put Beans in Each Slot To Match The Number On The Slot and The Color Listed

1	Black	7	Red
2	Red	8	Black
3	Black	9	Red
4	Red	10	Black
5	Black	11	Red
6	Red	12	Black

- When you are finished, all the beans in the cup should be in the Egg Carton.
- Make sure you count carefully so you do not miss any!

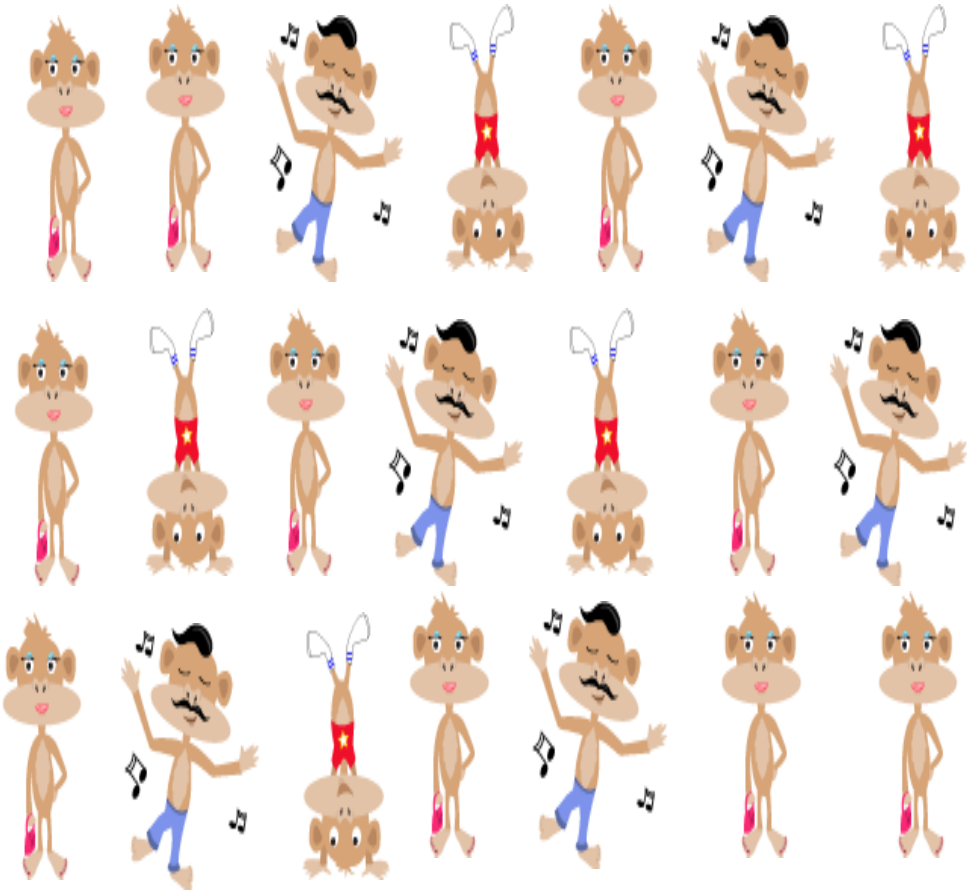
Who Is First?

- Which Frog is First? Second? Third? Fourth? Fifth? Sixth?
- Draw a line matching the frog to the correct number/position.

4 1 5 2 6 3

How Many Monkeys?

- How many monkeys are standing on their heads? ___
- How many monkeys are dancing? ___
- How many monkeys are at the party? ___



CEREAL COUNTDOWN

- Take one string of yarn
- Take a bowl of cereal.
- Thread the cereal on the string of yarn.
- Carefully count until you have 100 cereal circles on your string.
- If you can, create a pattern with the different colored cereal circles.

LEGO CHALLENGE

- Build A Tall Tower and Use Three Colors of Legos
- Write Down the Colors You Choose
- When you are done building your tower, how many Legos did you use of each color?

COLOR	NUMBER

- How Tall Is Your Tower? Count how many Legos you use in Total!

_____

ESTIMATION

- Look at the containers and make an estimate

- How many?
  - Jelly Beans _____
  - Grapes _____

- How much money is in the container? _____

  NAME

  _____

  CLASS

  _____

- The closest estimates will win a prize!

Graph Racing

- Use one Racing Sheet and each racer picks a different colored pen or pencil to use for racing.
- The youngest player goes first. Racer 1 rolls the dice, adds the numbers together and fills in the number of spaces to match.
- Racer 2 does the same, and this repeats over and over until the Finish Line is reached.
- The first racer to reach the Finish Line Wins!

Racing Course

START FINISH

PIPEPLAYER

- Pipelayer is a game played with two grids of dots that are slightly offset from one another. The rules are as follows:
- The players take turns moving by connecting two dots.
- A player can only connect dots that are adjacent horizontally or vertically and also only dots of his own color. One player plays using the black dots and the other player plays using the white dots.
- No move may draw across another move.
- To win a player must make a continuous connection from one side of the board to the other in the long direction for his color of dots. For the player using the black dots the dots must be connected top-to-bottom. For the white dots, the dots must be connect left-to-right.

VALUE OF WORDS

- What is in a name?
- Each person in the family should write down her/his name on a sheet of paper.
- Using the attached chart, add up the numbers that correspond to each letter.
- If you can add up the numbers without using pencil and paper.
- Whose name has the highest count?

VALUE OF WORDS

- Now, pick other words from your favorite book, and using the same chart, add up the numbers.
- Can you find a word that add up exactly to
  50?
  100?
  150?

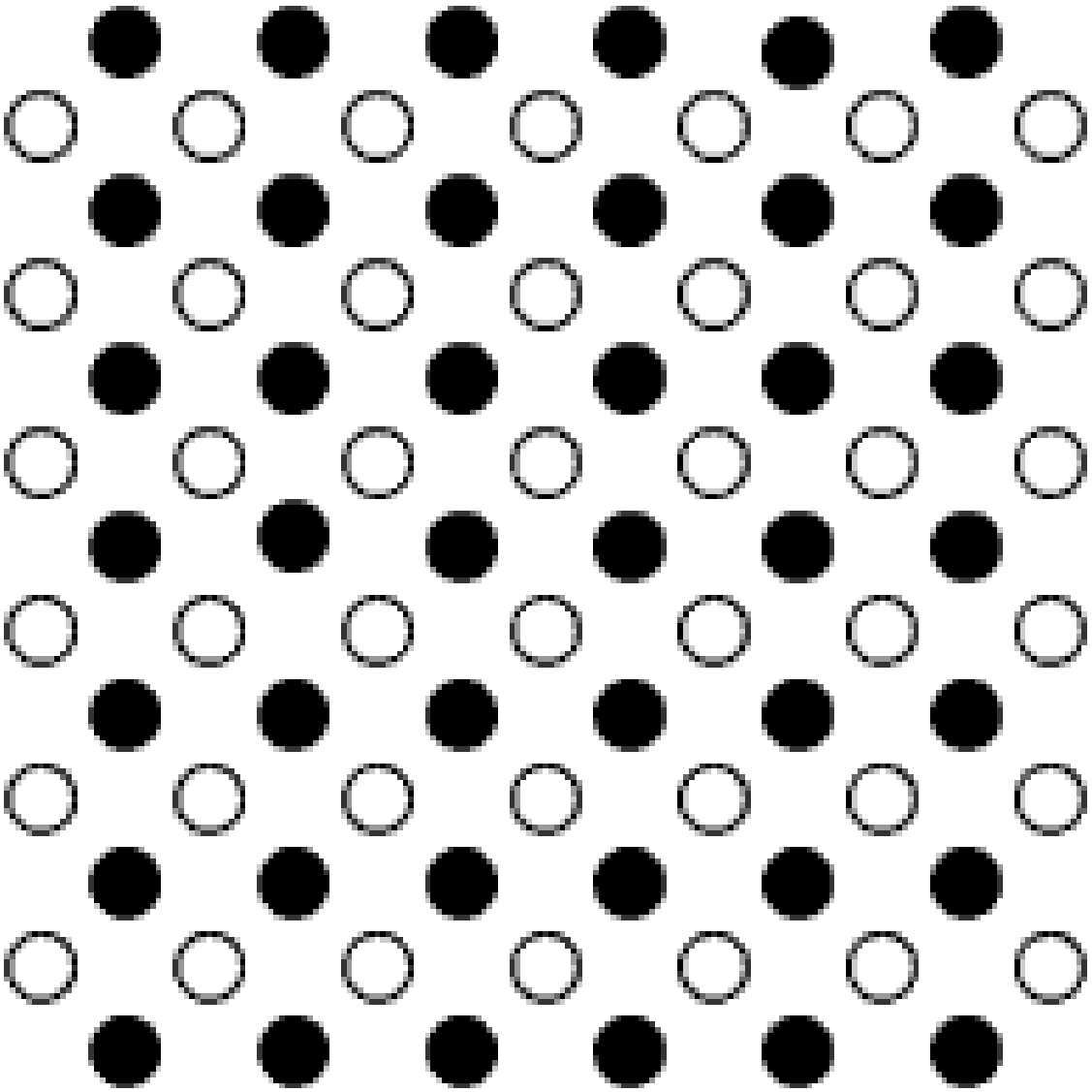
VALUE OF WORDS

A	1	N	14
B	2	O	15
C	3	P	16
D	4	Q	17
E	5	R	18
F	6	S	19
G	7	T	20
H	8	U	21
I	9	V	22
J	10	W	23
K	11	X	24
L	12	Y	25
M	13	Z	26

HOW MANY PAPER CLIPS?

- How many paper clips will it take to show how tall you are?
  Take a guess. _____
- Take out paper clips and start attaching them together until you have enough paper clips to measure how tall you are.
- Was your guess right? How many paper clips high are you? _____
- Compare your height with someone else. How many more or less paperclips high are you?

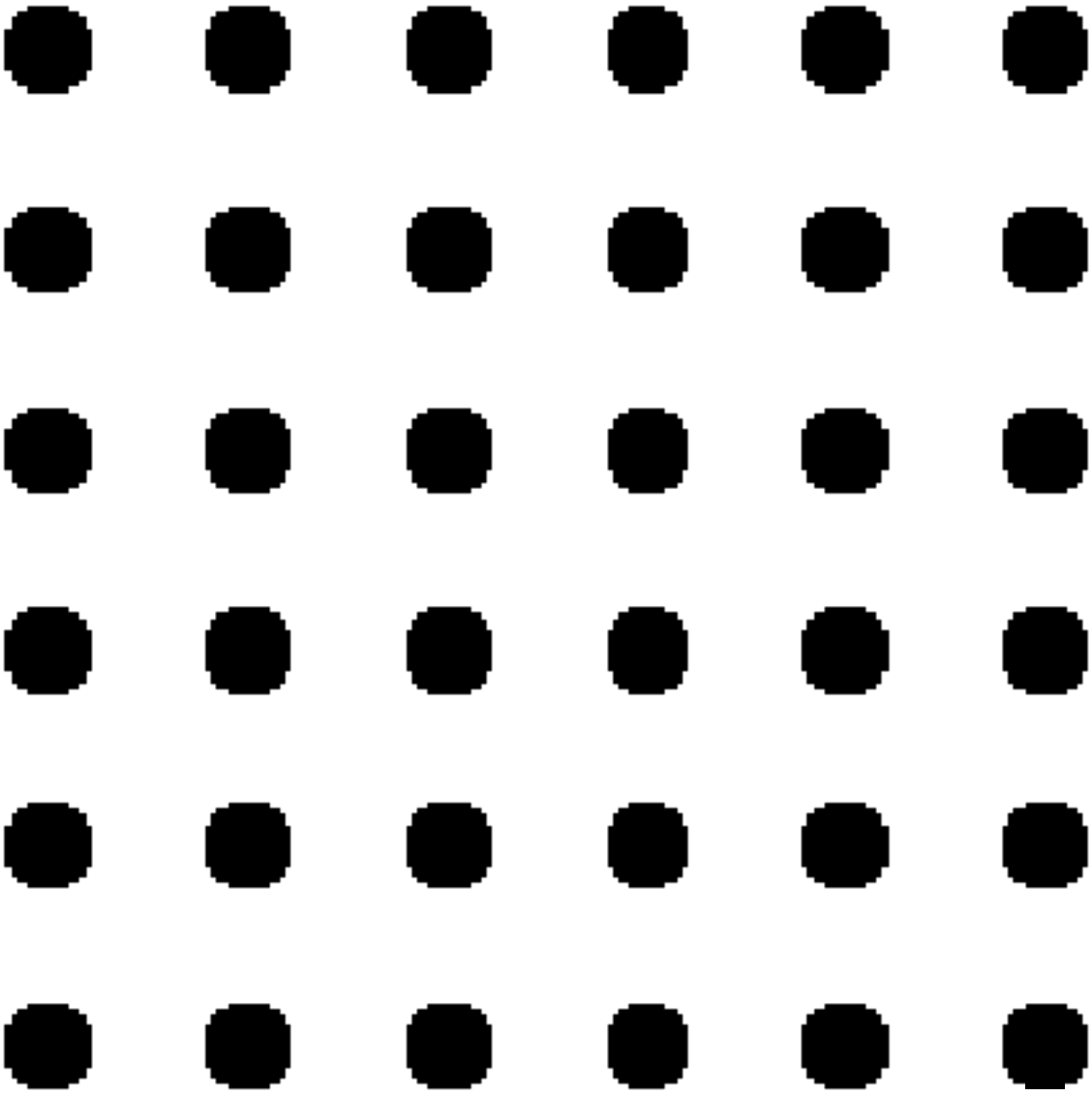
PIPEPLAYER



CAPTURE

- Capture is a two player game played on a grid of dots. Each player should use a different colored pencil/pen.
- The players take turns connecting dots that are horizontally or vertically adjacent. If a player can complete a square by connecting two dots then they capture that square.
- You must draw another line after making a capture. A player may, thus, make a large number of captures in a single turn. After the last capture he must still connect two dots.
- Most of the strategy in this game amounts to forcing the other player to complete the third side of a square. Beyond that, one capture may allow others and so you should work to arrange that you get the big chain of captures.
- The person who captures the most squares wins.

CAPTURE



What's To Eat?

- Using the menu provided, you will need to decide what you eat for three meals – without spending more than $40 in total.

Meal 1 Item	PRICE	Meal 2 Item	PRICE	Meal 3 Item	PRICE
	$		$		$
	$		$		$
	$		$		$
TOTAL Meal 1	$	TOTAL Meal 2	$	TOTAL Meal 3	$

TOTAL FOR ALL MEALS

$ _____

WAKE UP LATE BREAKFAST MENU

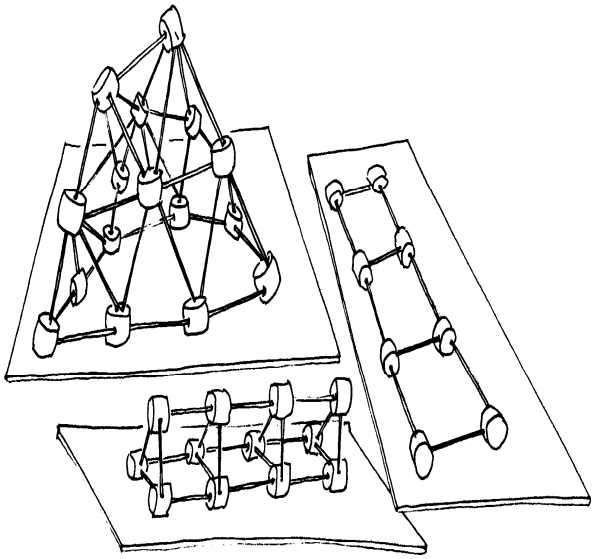
SCRAMBLES - All served W/ griddled mashed or crispy potatoes, fruit and biscuit •Hardwood smoked bacon, avocado, onion & Swiss •Ham, spinach & cheddar •Sundried tomato, basil & goat cheese •Ground turkey, mushroom & broccoli	9.95
FARM BISCUIT BENEDICTS - Homemade Biscuit split and crowned with scrambled eggs, Canadian Bacon, Mashed Potatoes and Delicious Hollandaise	11.95
FLAPJACKS SERVED W/ FRESH BUTTER & SYRUP - Buttermilk	6.95
SPECIAL FLAPJACKS Blueberry Pecan Brown Sugar Banana Mango Coconut add Whipped Cream .95	7.95
Griddled French Toast dipped in a banana cinnamon cream w/ pecan maple syrup	10.95

SANDWICH MENU

THE KOKOMO Griddled HH famous meatloaf with roasted tomato and smoked mozzarella on old fashioned milk bread	9.75
BBBLT (yes Bacon Rules) all on old fashioned milk bread w/ Mayo	8.95
FRESH ROASTED CHICKEN SALAD cucumber, bacon, tomato & spinach, on milk bread	9.50
CRISPY CORNMEAL SALMON SANDWICH w/ chili mayo, red leaf & tomato on a wheat bun	9.95
FAMOUS ONE POUND STUFFED BURGERS Two patties with stuffing in between on a fresh bun with lettuce, tomato, red onion and pickle.	9.95

INFINITE POSSIBILITIES

- Think about the different structures that are around you everyday. How do you think they were designed? What kinds of shapes do you find in these objects and structures?
- Pick something that you want to try to build out of toothpicks and marshmallows!
- What can you build using toothpicks and marshmallows?
  - Pyramid
  - Prism
  - Bridge
  - Boat
  - Building
  - Car
- Take 20 Toothpicks and 15 Marshmallows and Build Your Dream!

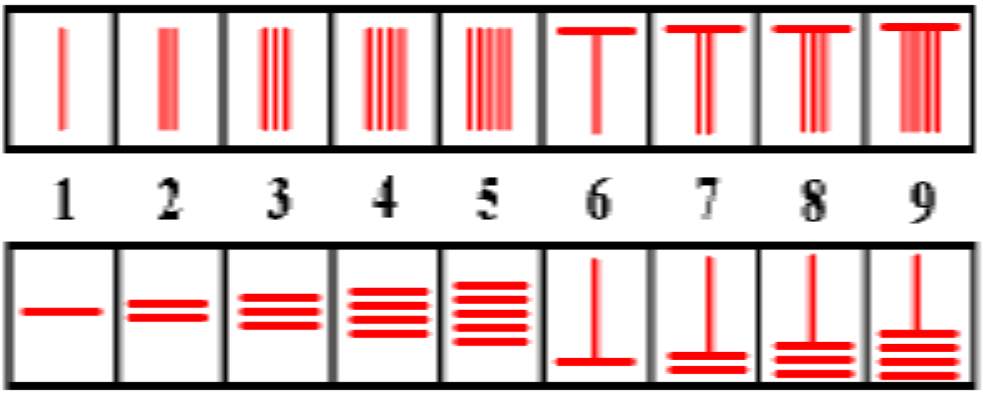


Chinese Number Rods

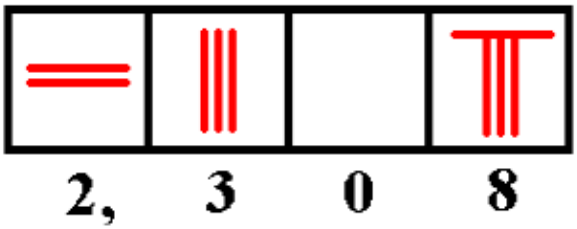
- About 2400 years ago Chinese mathematicians came up with a novel counting device. People who did calculations would carry a case of plain rods about the size of small pretzel sticks, some black and some red. The rods were laid out on a giant checkerboard to represent numbers. Each column of the checkerboard represented a place value, ones, tens, hundreds, etc.
- A square on the checkerboard contained a digit of a number.

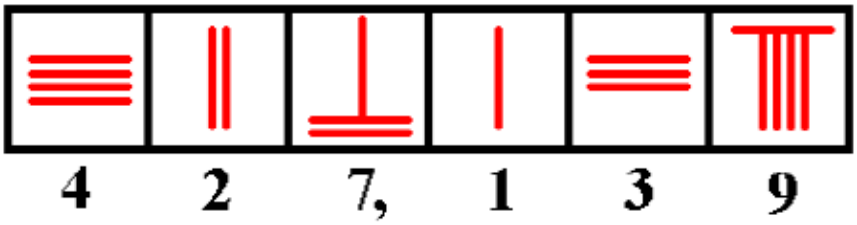
Chinese Number Rods

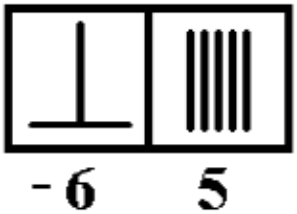
- There were two ways to represent each digit:
  - The rod arrangements on the top row were used for the ones place, the hundreds place, the ten thousands place, etc.
  - The rod arrangements on the bottom row were used for the tens place, the thousands place, etc.
- Red rods represented positive numbers and black rods represented negative numbers.



Here are a few examples:







Can You Write These Numbers?

2561						
8003						
79214						
598,735						
15236						
-9401						
94060						
987,654						

INCA QUIPU

- As far as the Inca were concerned, theirs was the greatest of all the world's civilizations. Their empire was the largest of the pre-industrial world; their golden capital, Cuzco, the richest city in the Americas.

- Beginning in the 1300s, the Inca moved down from their Andean homeland to conquer the neighboring lands and peoples along the Pacific coast of South America. By the time the Spanish arrived in the early 1500s, the Inca Empire was at the height of its power. It stretched some 2,500 miles—the approximate distance from Washington, DC, to Los Angeles, California—and incorporated more than 12 million people speaking 20 different languages.

QUIPU

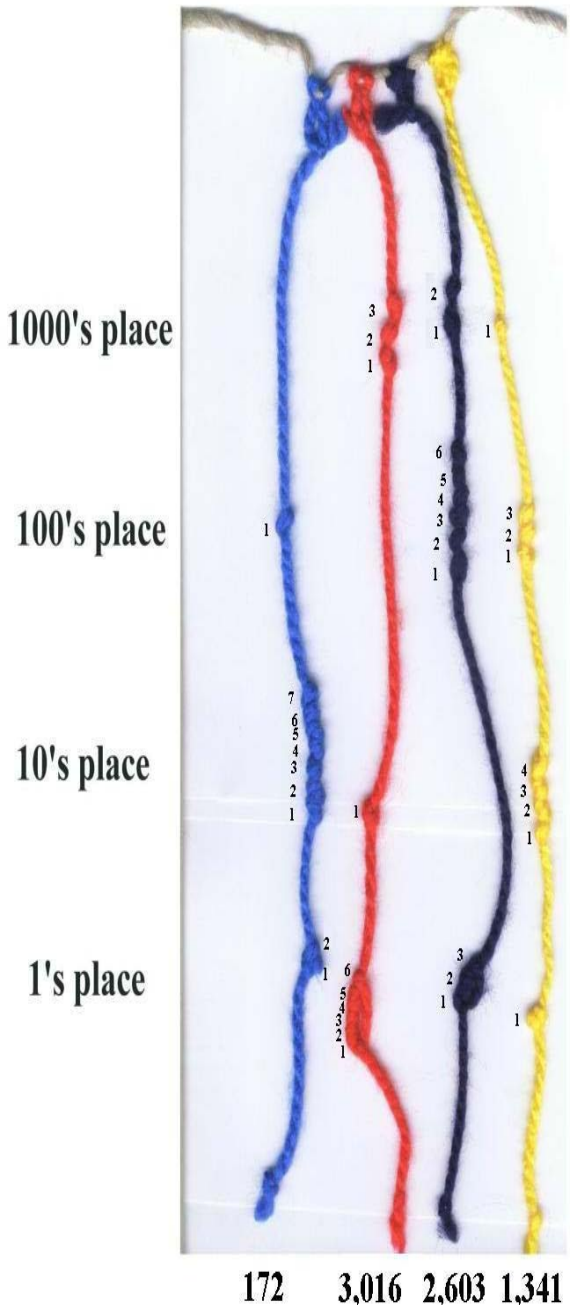
- To pass on their messages, Inca couriers used many tools including quipus. Quipu means knot in Quechua, the native language of the Andes. The quipu was a useful record-keeping tool for the Inca government.

- Quipus were special knotted strings that kept track of numbers. Different-colored quipus stood for different things. Yellow, for example, stood for gold; red stood for warriors. Different knotted strings were tied together to convey a message.

QUIPU

- To read a number on a quipu, you count the knots in each place to figure out how many ones, tens, hundreds, and so on are recorded.

- If there are no knots in one of the places, that represents 0 in that place.



Make their own quipu

- Tell A Story About You
  - Take three pieces of yarn.
  - Using the first piece of yarn, show the year when you were born.
  - On the second piece of yarn, show the year you will graduate from High School
  - On the third piece of yarn, show the year you will graduate from College.
  - Tie all three yarns together, and you will have a story about your life that you can share.

The Sum What Dice Game

- Each Player Has A Playing Strip
- Players Take Turns Rolling Two Dice
- On each turn the player may cover either the sum rolled on the dice or any two numbers that are still uncovered and that add to the sum rolled.
- For Example, if a sum of 9 is rolled first, the player may cover: 9, or 1 and 8, or 2 and 7, or 3 and 6 or 4 and 5.
- Later in the game if the number 9 is rolled again and the 5 is already covered, then the player cannot use the 4 and 5 combination and must play one of the other available options.
- When a player cannot play, he or she is out and has a score of the sum of the uncovered numbers.
- Play continues until everyone is out.
- The last person to go out will not necessarily win; the person with the lowest score wins.

Playing Strip

1	2	3	4	5	6	7	8	9

1	2	3	4	5	6	7	8	9

COIN BOARD

 LIBERTY IN GOD WE TRUST 1989	 LIBERTY IN GOD WE TRUST	 IN GOD WE TRUST LIBERTY	 IN GOD WE TRUST LIBERTY

PAYING THE PRICE

- Help your child find how many different ways you could pay for each of the items using pennies, nickels, dimes and/or quarters.
- Using the Coin Board, layout the coins in the correct column, then make a record how many ways there were to pay for the item.
- For example, for an eraser that costs $.05, there could be two ways to pay:
  - 5 Pennies
  - 1 Nickel

PAYING THE PRICE

Item	POSTAGE	ICE CREAM	PENCIL	ERASER	MILK	APPLE	GOLD FISH
							
Price	$.44	$.62	$.18	$.09	$.50	$.77	$1.00
Coin Combi-nations							

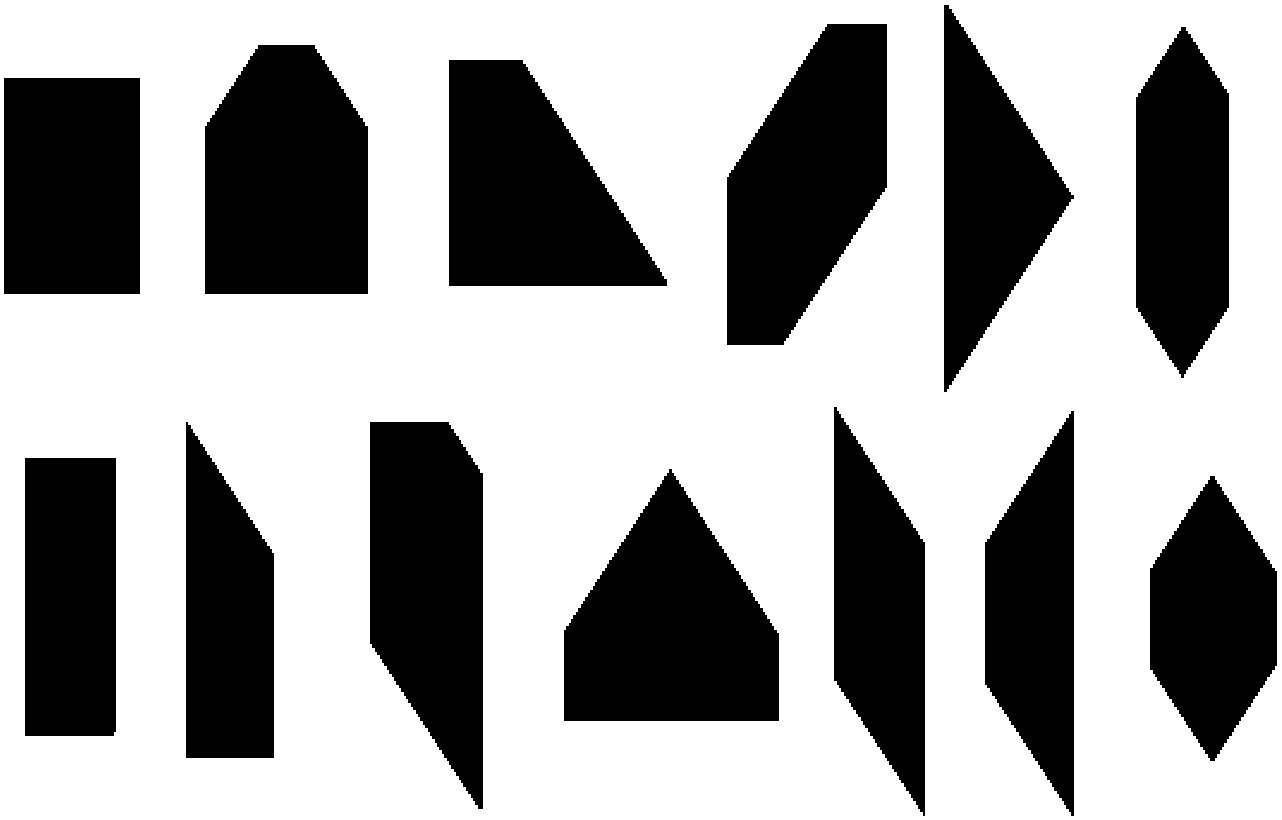
TANGRAMS

- The origins of the Tangram puzzle are not known with any certainty, but the idea is thought to have originated in China about 250 years ago.
- The true origin of Tangrams is lost in the shrouds of time, though there are many stories to explain where the puzzle come from.
  - Some say they were created when a man named Tan broke a plate and used the pieces for a puzzle.
  - Another story says they were a royal pasttime in the emperor's court during the Tang dynasty.
  - Others maintain that the game was spread by the Tanka river people in China when they traded with American sailors.
- Tangrams have captured the imagination of people worldwide, and even were a favorite of Napoleon.
- Tangrams consist of seven pieces which can be arranged to make countless pictures.

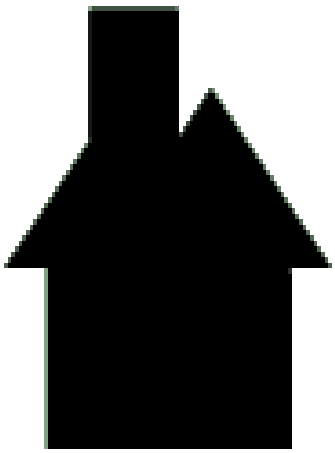
The Tangram Rules

- You must use all seven tans.
- They must lay flat.
- They must touch and none may overlap.
- BUT!
- Feel free to break away from the "rules“!
- ENJOY!

TANGRAMS



TANGRAMS



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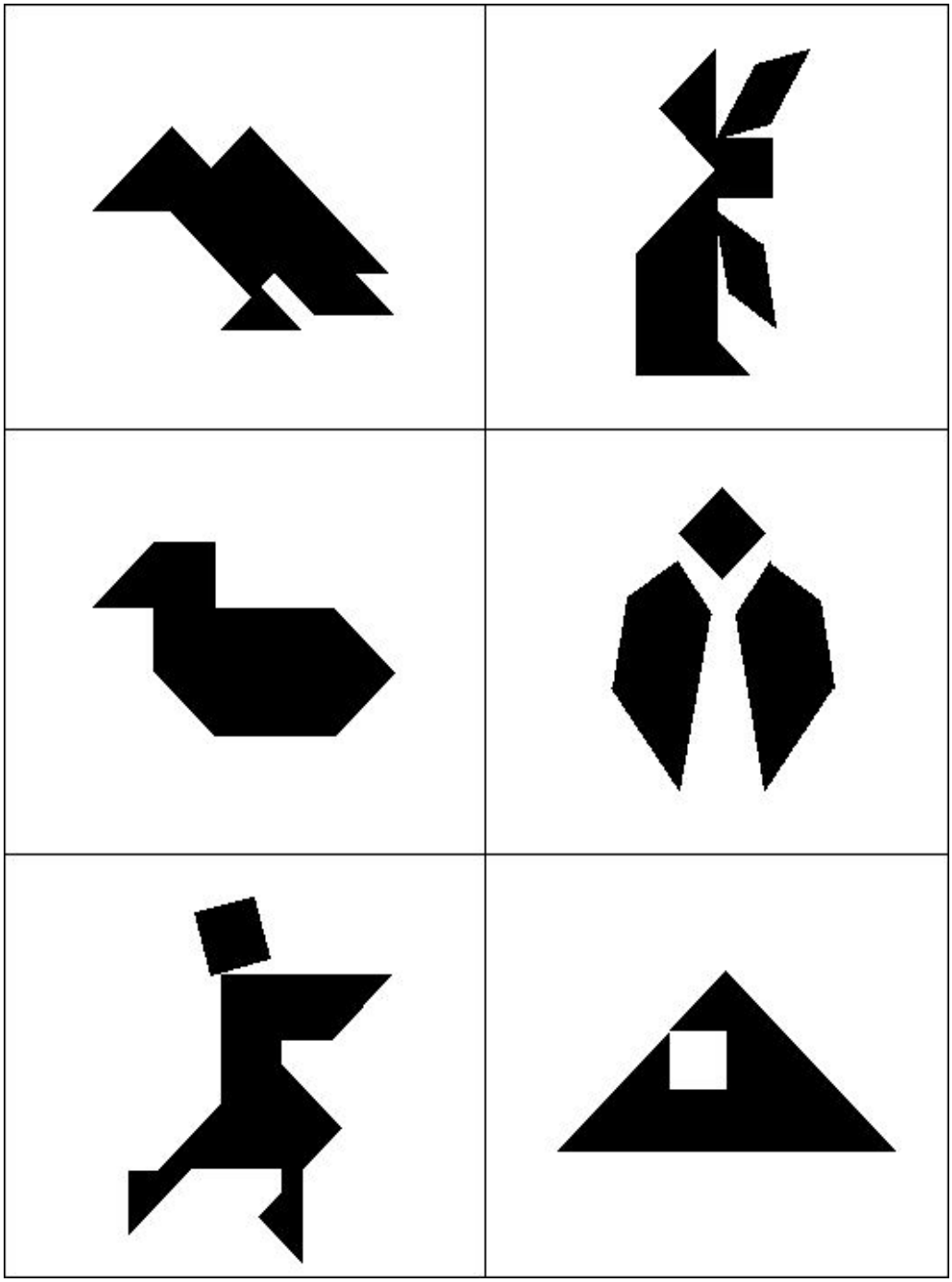
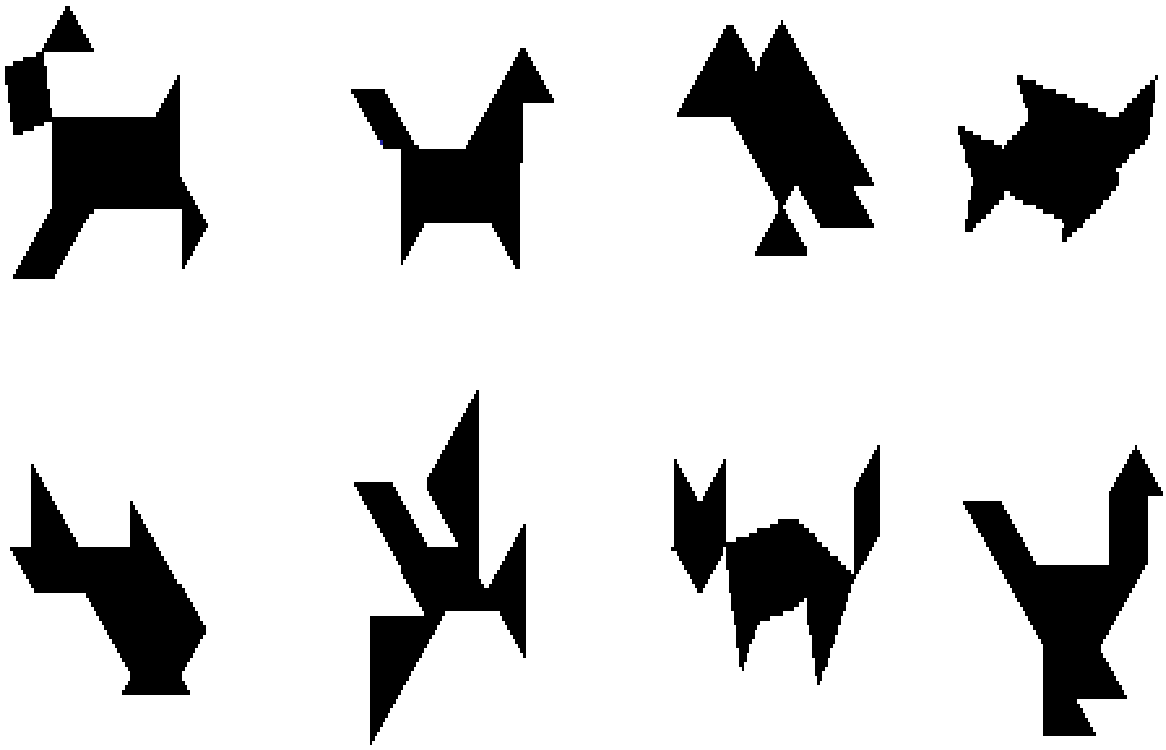
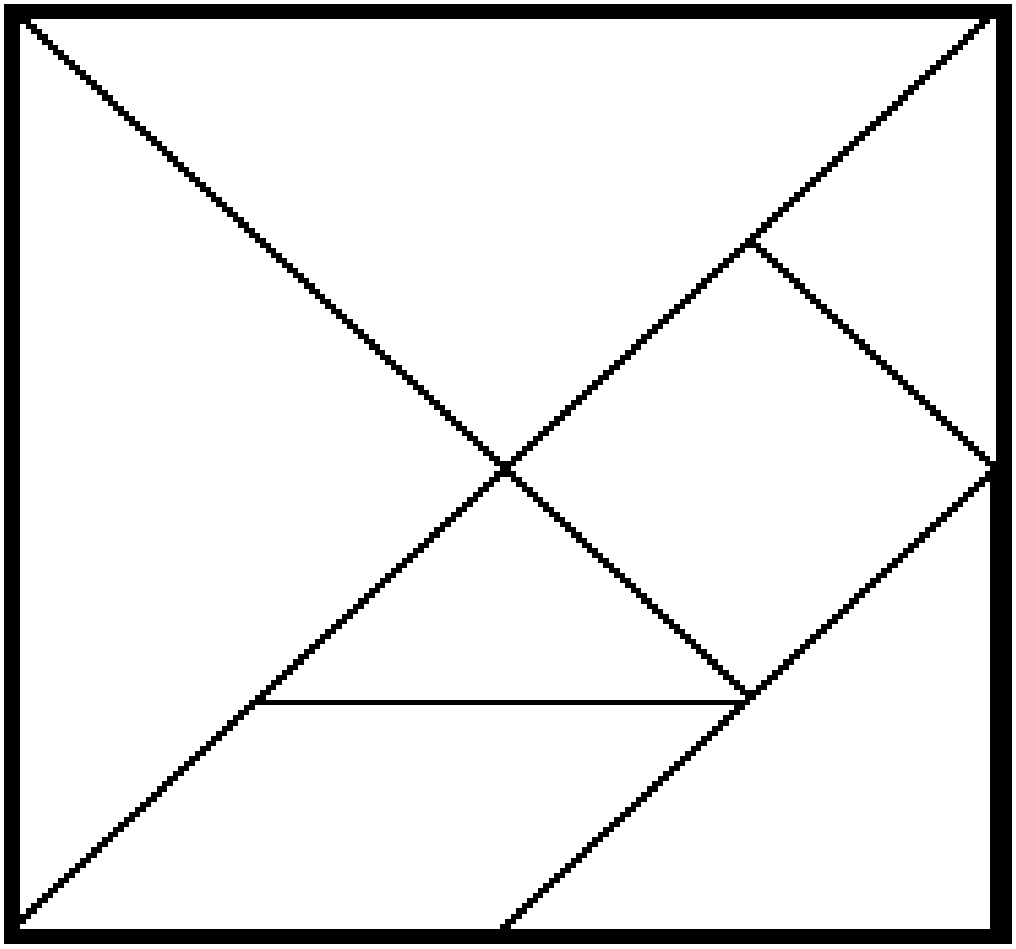
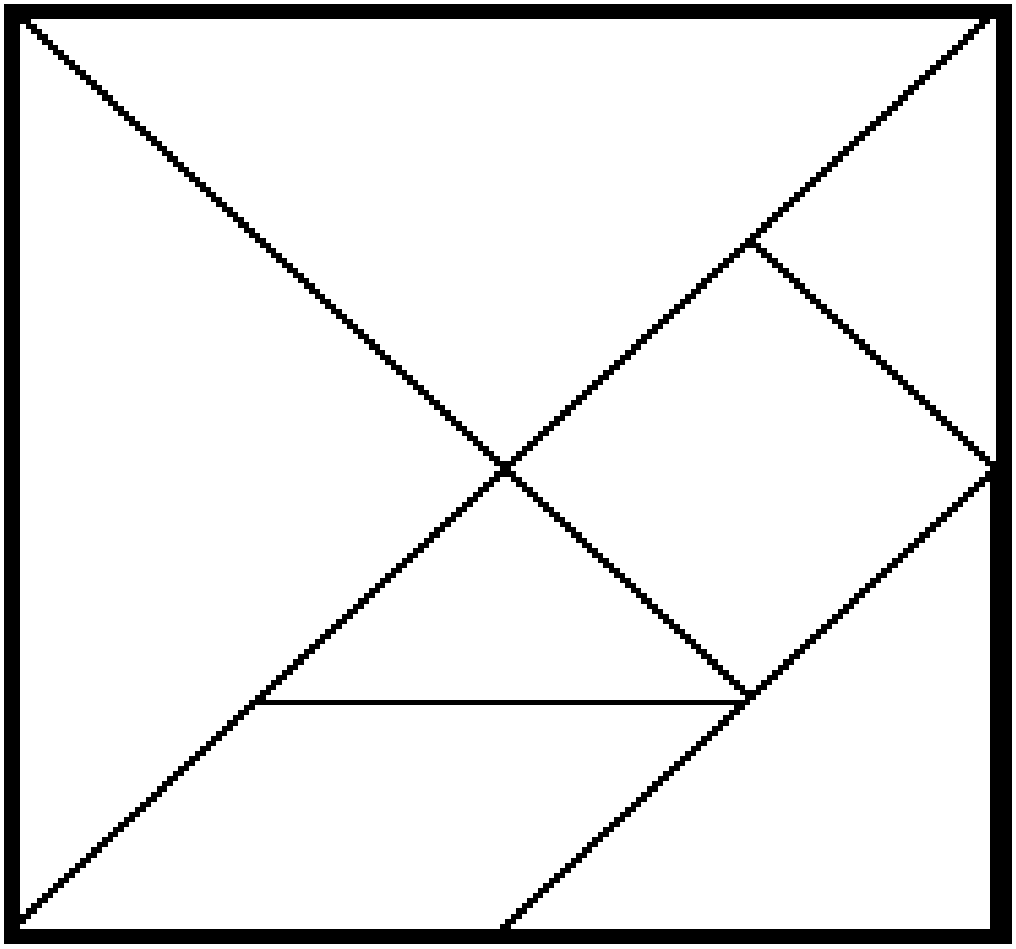


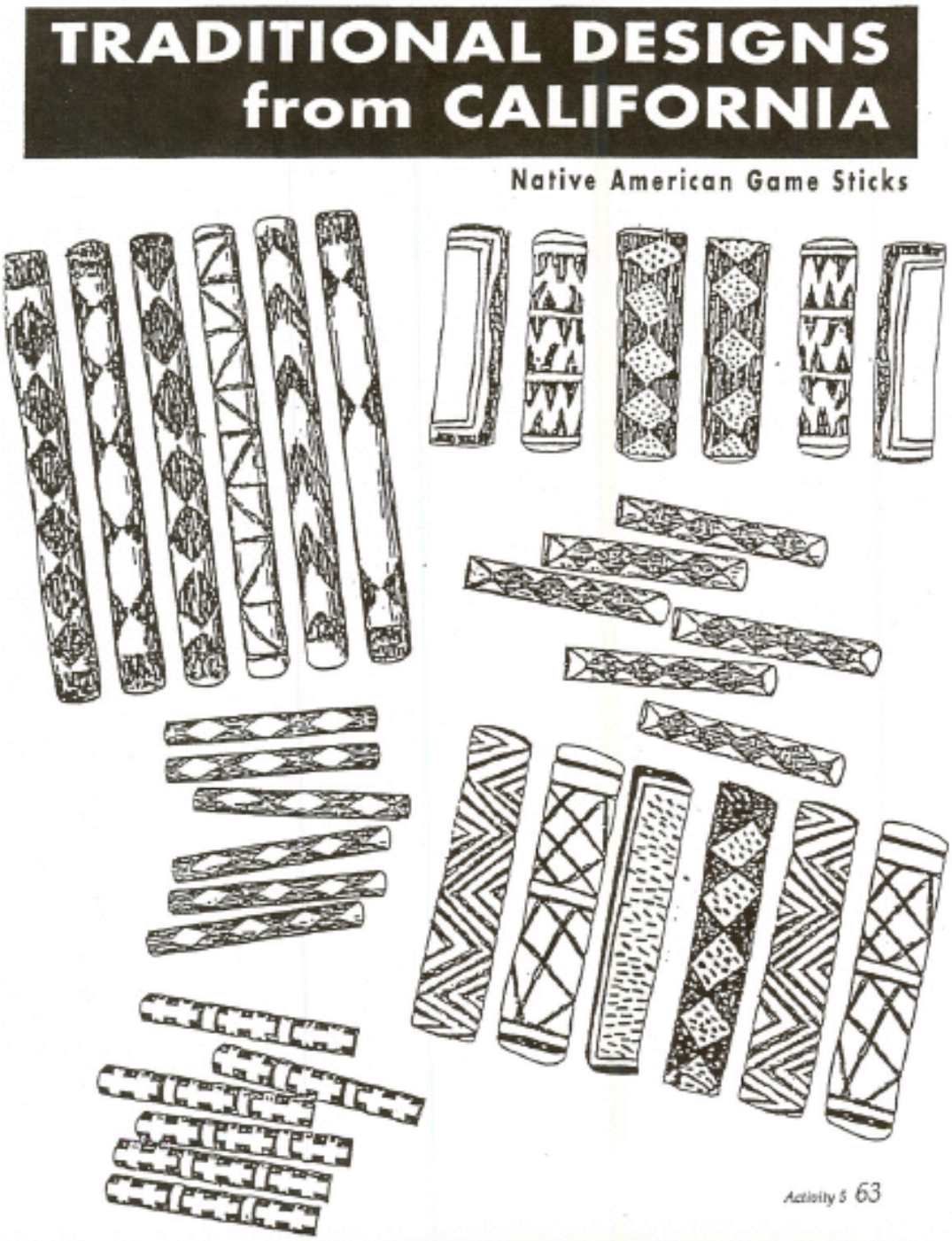
TANGRAMS







Native American Game Sticks



GAME STICKS DIRECTIONS

- The object of the game is for one player to obtain all 10 counters.
- Two players need 1 set of 4 game sticks and 10 counters.
- Players alternate turns tossing the sticks. Toss the sticks to see which player will go first. The player with the most design sides up on her toss goes first.
- Counters are obtained by the toss of the sticks as follows:
  a. If all 4 sticks land on the design side, then take 2 counters.
  b. If all 4 sticks land on the plain side, then take 2 counters.
  c. If the sticks land with 2 plain and 2 design sides, then take 1 counter.
  d. If the sticks land in any other combination, take no counters.
- Play continues until there are no counters left in the initial group of counters. Now when a toss is made that merits counters, the opposing player has to give the player counters from her pile.

  For example, Player 1 has 6 counters and Player 2 has 4 counters. It is player 2's turn to toss. Her toss is 4 sticks on the plain side. Now Player 1 must give Player 2 two counters.
- Play continues until one player wins all the counters.

Game Sticks Recording Sheet

by Jaine Kopp

1. Toss your sticks 20 times. Cross out a number each time you toss so that you will know when you have made 20 tosses.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

2. Record each toss on the chart below in the box that shows how your sticks fell.

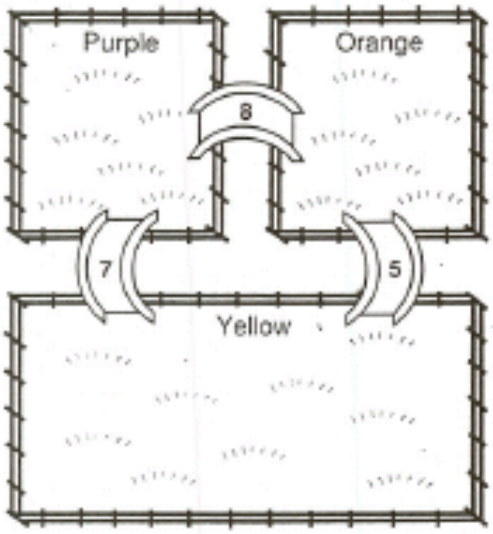
YAHTZEE

YAHTZEE SCORESHEET				
Player Name				
Ones				
Twos				
Threes				
Fours				
Fives				
Sixes				
Subtotal				
Bonus				
Upper Total				
3 of a Kind				
4 of a Kind				
Full House				
Small Straight				
Large Straight				
Yahtzee				
Chance				
Bonus Yahtzee				
Lower Total				
Upper Total				
Lower Total				
Grand Total				

PASTURE 1

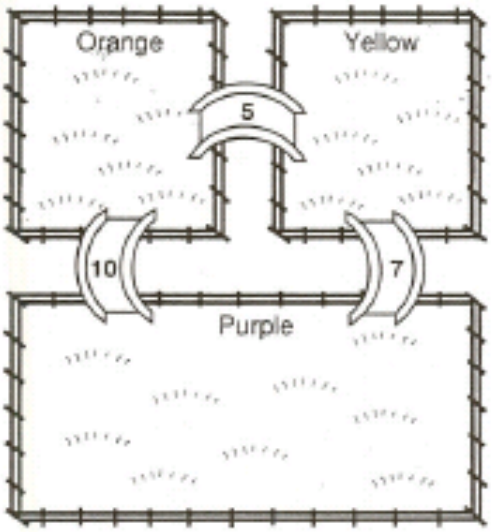
- There are cows in each pasture. The pastures are connected by bridges. The number on each bridge tells the total number of cows in the two pastures it connects. Using the beans, find out how many cows are in each pasture.

1.



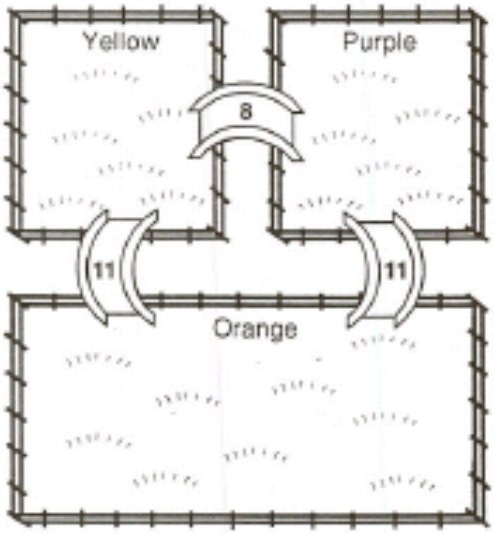
Hint: Orange = 3

2.



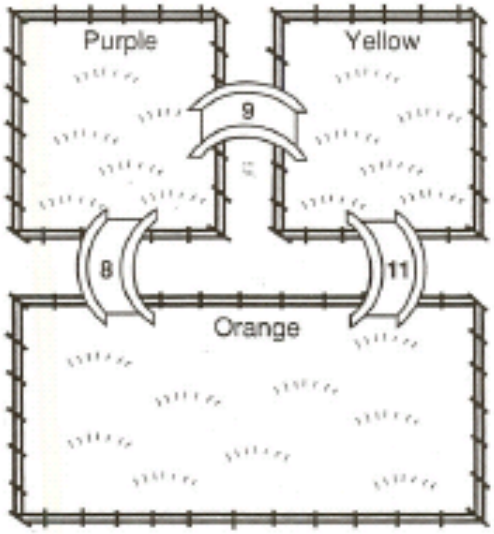
Hint: Purple = 6

3.



Hint: Yellow = 4

4.

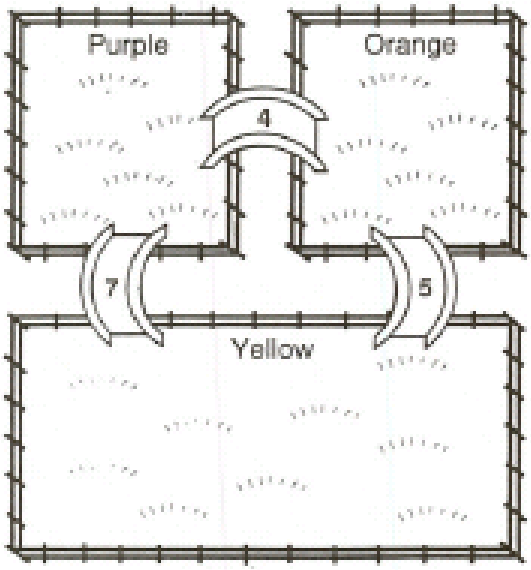


Hint: Orange = 5

PASTURE 2

- There are cows in each pasture. The pastures are connected by bridges. The number on each bridge tells the total number of cows in the two pastures it connects. Using the beans, find out how many cows are in each pasture.

1.



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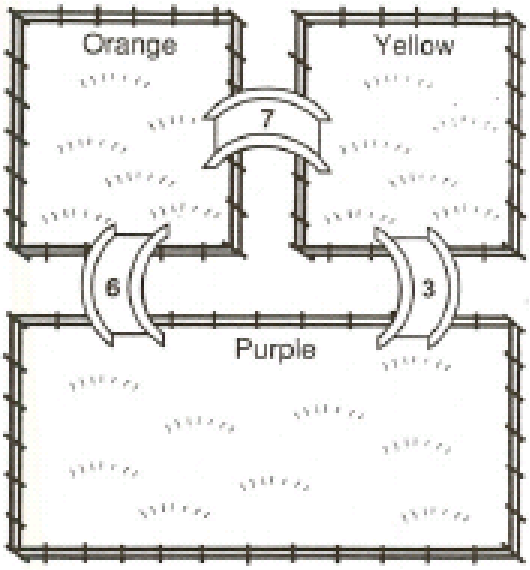
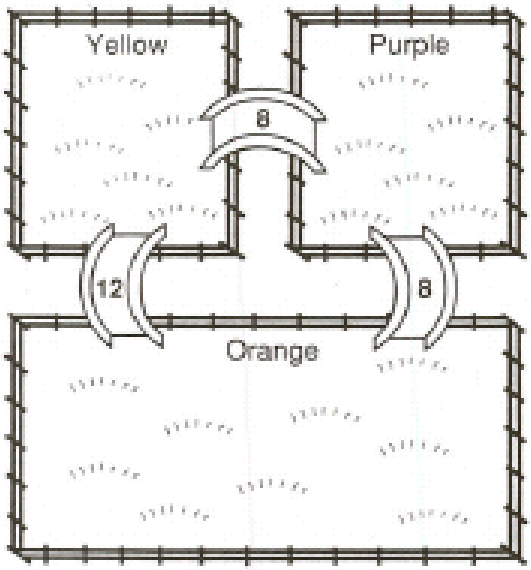
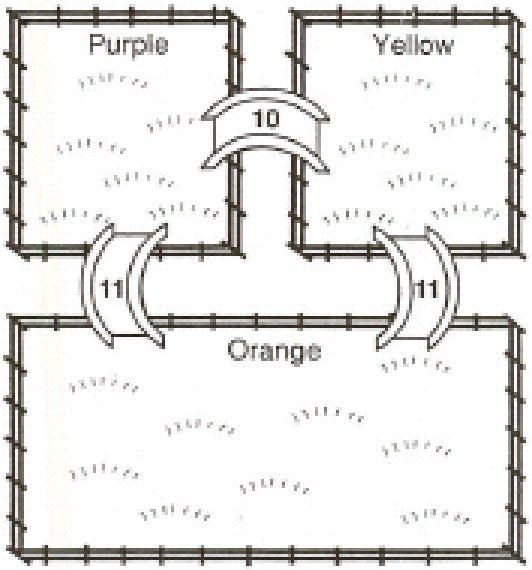


3.



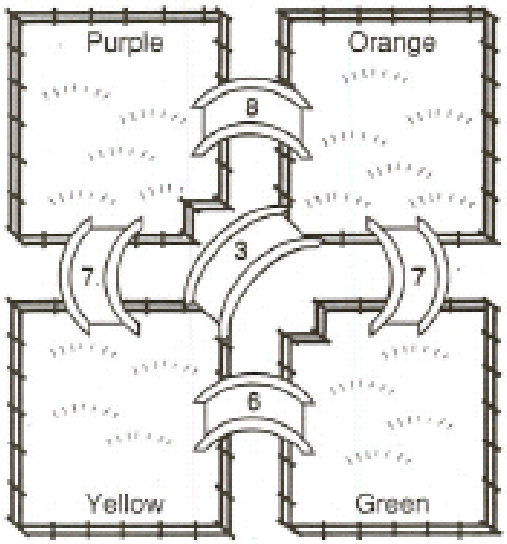
4.



PASTURE 3

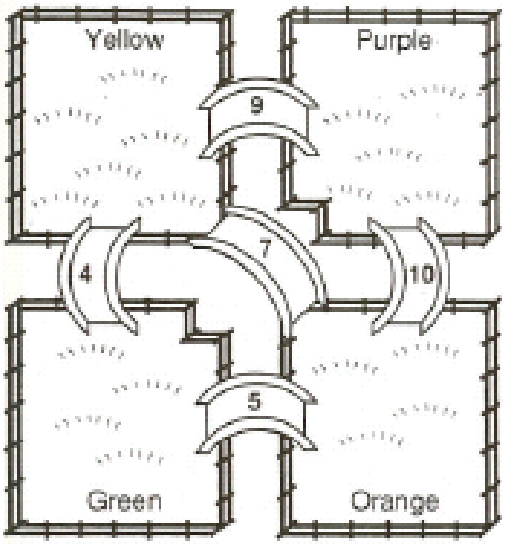
- There are cows in each pasture. The pastures are connected by bridges. The number on each bridge tells the total number of cows in the two pastures it connects. Using the beans, find out how many cows are in each pasture.

1.



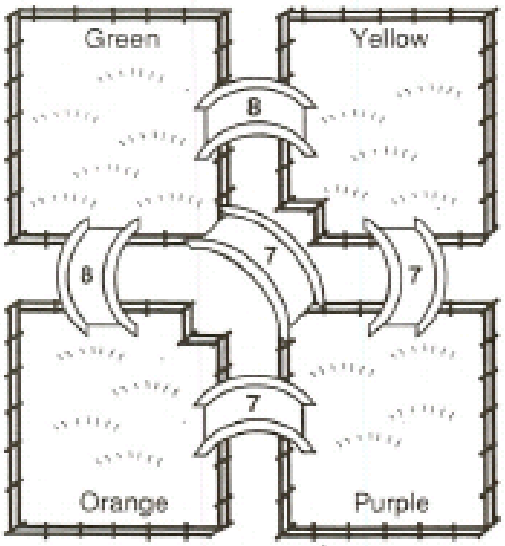
Hint: Total number of cows = 14

2.



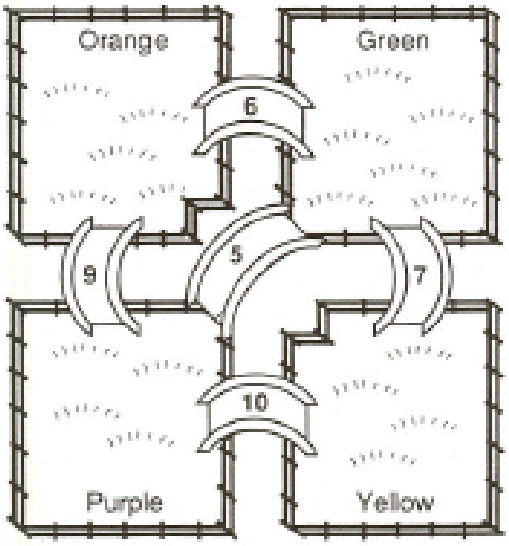
Hint: Total number of cows = 14

3.



Hint: Total number of cows = 15

4.

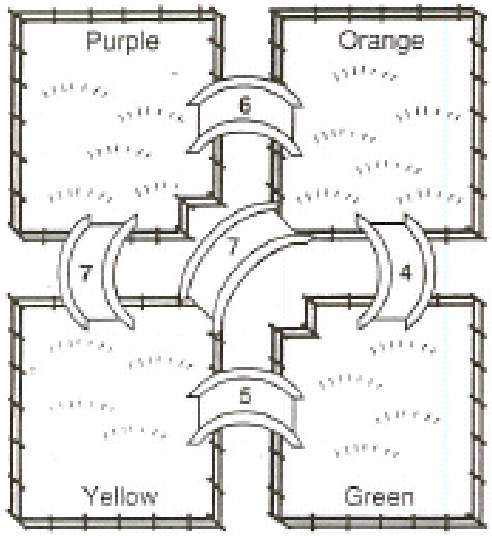


Hint: Total number of cows = 16

PASTURE 4

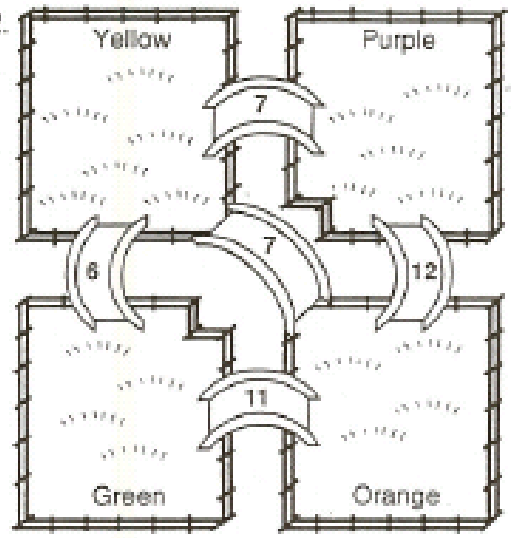
- There are cows in each pasture. The pastures are connected by bridges. The number on each bridge tells the total number of cows in the two pastures it connects. Using the beans, find out how many cows are in each pasture.

1.



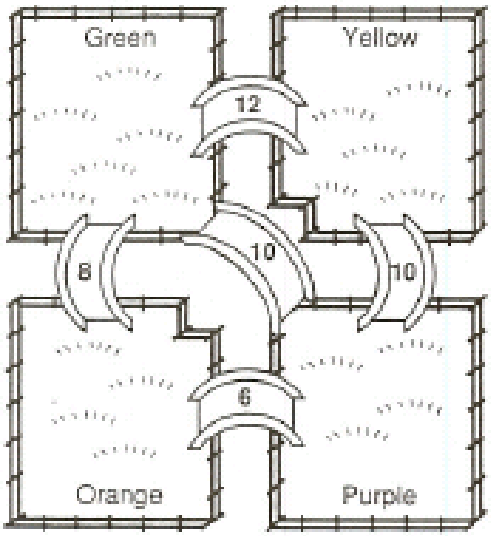
Hint: Total number of cows = 11

2.



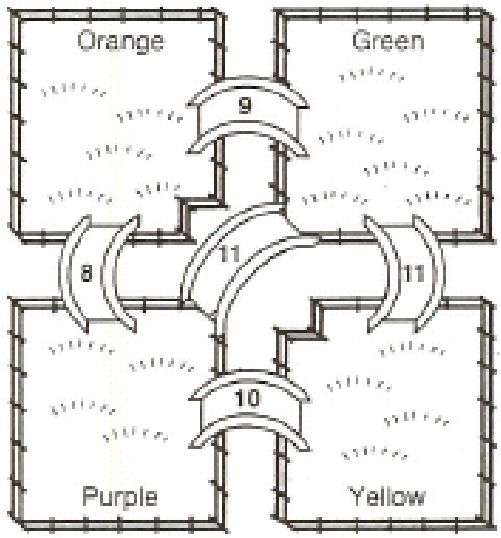
Hint: Total number of cows = 19

3.



Hint: Total number of cows = 18

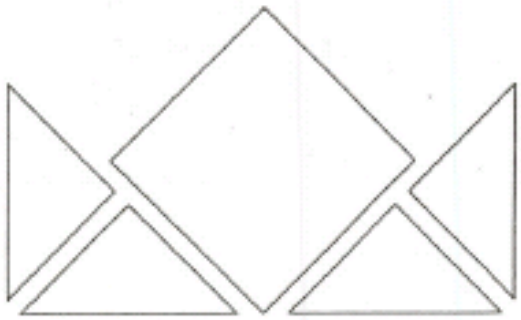
4.



Hint: Total number of cows = 19

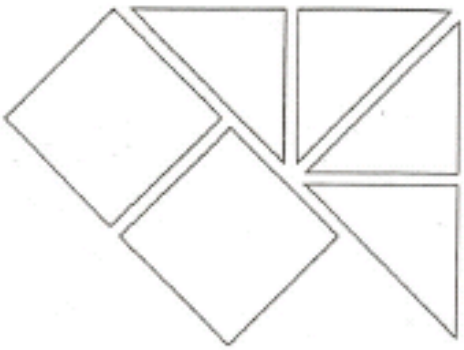
Magical Folds

① Fold to make these shapes.



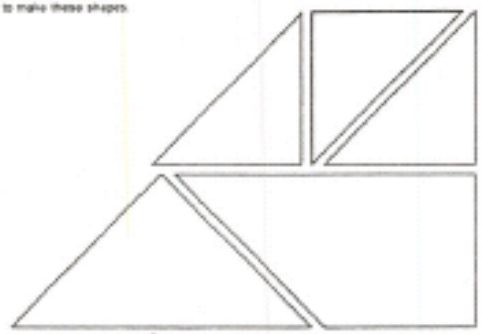
Draw lines to show the folds.

② Fold to make these shapes.



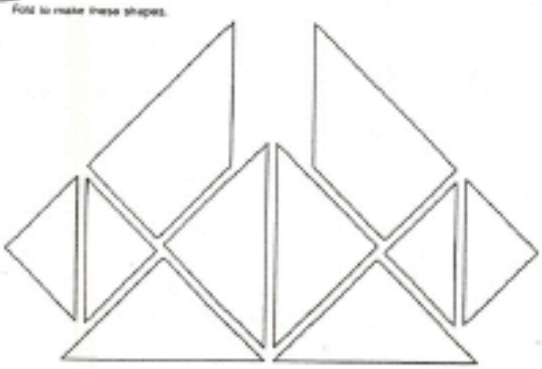
Draw lines to show the folds.

③ Fold to make these shapes.



Draw lines to show the folds.

④ Fold to make these shapes.

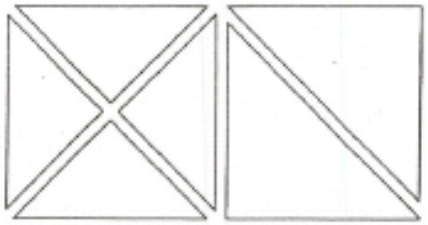


Draw lines to show the folds.

Magical Folds

(5)

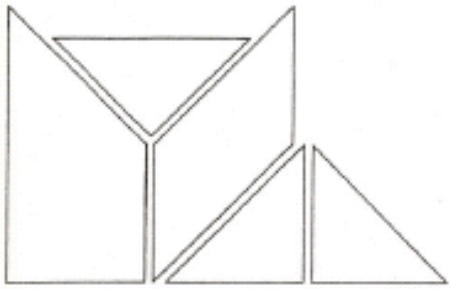
Fold to make these shapes.



Draw lines to show the folds.

(6)

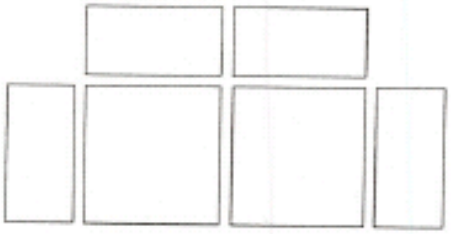
Fold to make these shapes.



Draw lines to show the folds.

(7)

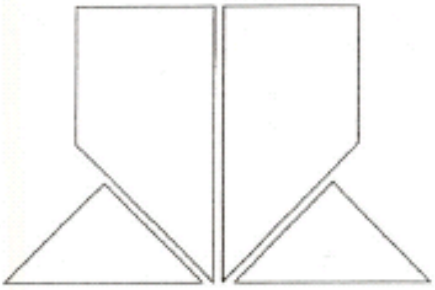
Fold to make these shapes.



Draw lines to show the folds.

(8)

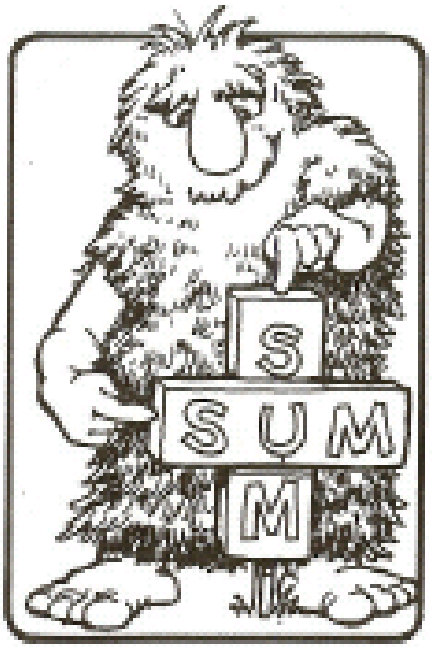
Fold to make these shapes.



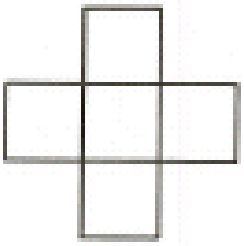
Draw lines to show the folds.

CROSS SUM

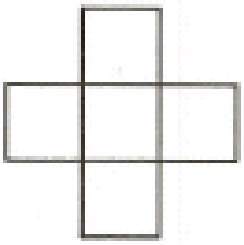
In each cross puzzle below, place the numbers 1, 2, 3, 4, 5 in the squares, so that the sum of three numbers in a vertical or horizontal line equals the sum given above that puzzle.



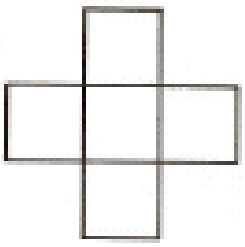
sum = 8



sum = 9



sum = 10



CROSS SUM ANSWERS

Answers:

Sum = 8

	2	
3	1	4
	5	

Sum = 9

	1	
2	3	4
	5	

Sum = 10

	1	
2	5	3
	4	

About the Problem:

This is an easy three-part problem designed to give students confidence and practice with the guess-and-check strategy. You may need to clarify that a number can't be used twice. This problem will lead nicely into the *Sum of Thirteen* problem, if you discuss the process of listing all the combinations of a given sum.

Getting Started:

Let the students use trial and error here. In later more complex problems, they will see its limitations, and will begin to appreciate the advantages of using organized lists of combinations.

Some students might want to write the numbers 1 through 5 on separate slips of paper, and move them around within the puzzle until they find a correct solution.

Solution:

Most students will solve these puzzles by trial and error.

Going Beyond:

This is a good opportunity to discuss a way for the students to organize their trial-and-error approach. For example, consider the first part of the problem. We are looking for a sum of 8. What possible triples have a sum of 8?

1 – 2 – 5
1 – 3 – 4

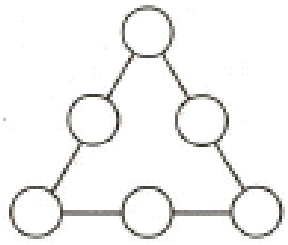
There are only two possibilities. In the puzzle, one number must appear in both a column and a row. So 1 must be the number to place in the center of the puzzle. If 2 and 5 are placed in the column, then 3 and 4 must be placed in the row, and vice versa.

In a similar fashion, the students can list the number triples with sums of 9 and 10 to help solve the remaining two parts of the problem.

Remember that a rotation or a reflection of any puzzle solution is not considered a different solution.

Here is a good set of similar problems that are slightly more difficult.

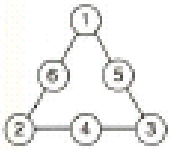
Place the first six counting numbers in the circles below so that the sum on each side of the triangle is 9. Can you do this so that the sum is 10? 11? 12?



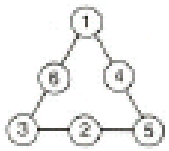
Have students make lists of combinations to help them solve the four puzzles.

Answers:

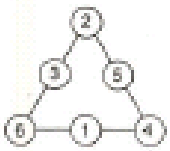
sum = 9



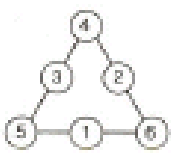
sum = 10



sum = 11

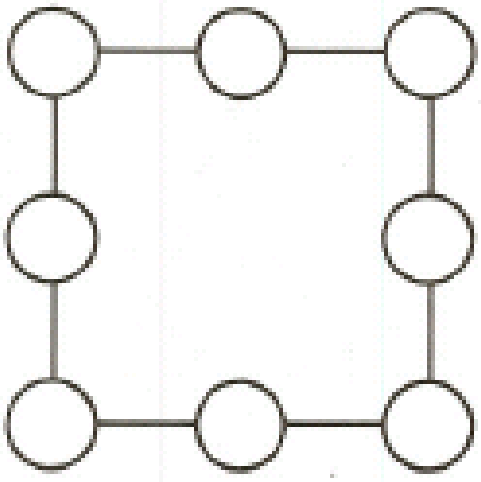


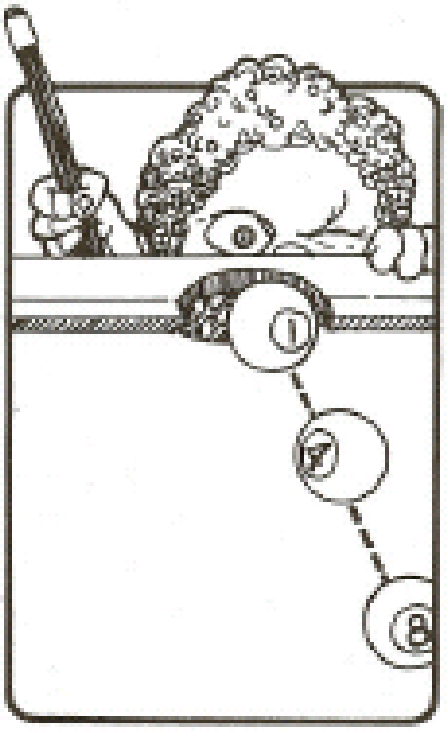
sum = 12



SUM OF THIRTEEN

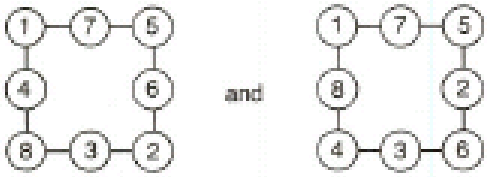
Place the numbers 1, 2, 3, 4, 5, 6, 7, 8 in the eight circles so that the sum of the numbers in any line equals 13.





SUM OF THIRTEEN ANSWERS

Answer: Two possible solutions are



About the Problem:

This kind of problem gives students a chance to test their logic and organization ability as well as giving them some addition practice. The problem can be solved by trial and error but some good reasoning will shorten the solution process. The Warm-up problem which encourages students to list all combinations of a given sum helps prepare them for this problem.

Getting Started:

Observe the different ways students approach the problem. After the problem has been solved by several students, a discussion by the class on different ways to approach the problem may be particularly helpful to students the next time they encounter this type of problem.

Here are some hints.

> Make a list of all of the three-number combinations of 1 through 8 that total 13.
>
> Start with any number in one corner. Test its combinations on two sides of the square. Shift numbers and try different possibilities.

Solution:

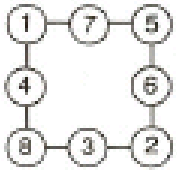
A list of combinations provides a handy reference as the guess-and-check process begins.

sum = 13

1-8-4
1-7-5
2-8-3
2-7-4
2-6-5
3-6-4

Typical reasoning might be as follows:

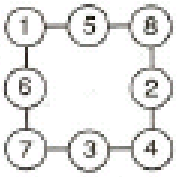
"I will try 1 in a corner because it is in two combinations, 1-8-4 and 1-7-5. I will try 7 and 8 in corners that connect with 1. Eight uses 2 and 3 in its other combination. That's okay. I haven't used them yet. Seven uses 2 and 4 in its other combination. That won't work since I used 4 with 1-8-4. Therefore 7 can't be in the corner. I'll try 8 and 5 in the corners. That's okay because the other combination that uses 5 is 5-2-6. I haven't used 6 yet. Two must be used with 8 so it goes in a corner. All done. Check the sums. Are they all 13? Yes. I have a solution."



Going Beyond:

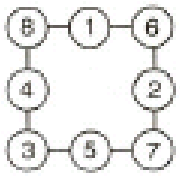
1. Now that you know how to solve this kind of problem, can you find a solution for a sum of 14?

Answer:



2. Can you solve this problem with a sum of 15?

Answer:



ALL SHOOK UP

Eight people meet at a party. They all exchange handshakes. How many handshakes are exchanged?

ALL SHOOK UP ANSWERS

Answer: 28 handshakes

About the Problem:

No prerequisites are required here except counting. The problem is a good one because it can be approached in a variety of ways. It also provides an opportunity to be involved with combinations in which order is not important. That is, A shaking hands with B is the same handshake as B shaking hands with A. The obvious fact that no person shakes hands with himself may need to be pointed out to some students.

Getting Started:

This problem can be acted out by class members in front of the class. In order to record data, students may need to use names or symbols. See how they think this out on their own, then later discuss the advantages of using *A*, *B*, *C*, *D*, and so on.

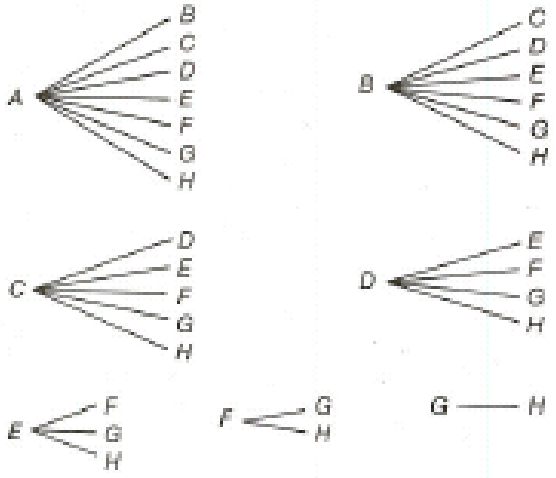
Some helpful hints are

Can you draw a diagram that represents the problem?

Can you make a chart or list of all the handshakes?

Solution:

We represent the eight people by the letters *A* through *H*. Two styles of listing are shown below. The first is a tree diagram. The second is an organized listing of the pairs of people.

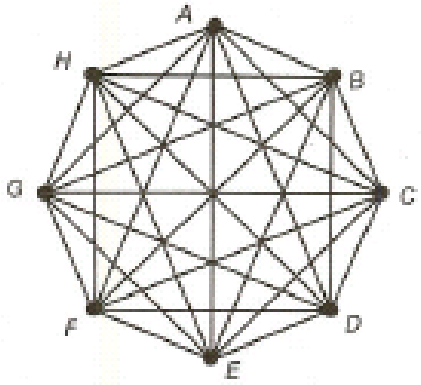


7 + 6 + 5 + 4 + 3 + 2 + 1 = 28 handshakes

Organized listing

AB,AC,AD,AE,AF,AG,AH
BC,BD,BE,BF,BG,BH
CD,CE,CF,CG,CH
DE,DF,DG,DH
EF,EG,EH
FG,FH
GH

Some students may prefer a geometric model. A line segment connecting points *A* and *B* could represent a handshake. The eight people could be modeled as shown in the figure below. Handshakes are counted as the problem solver connects *A* to *B*, *A* to *C*, *A* to *D*, and so on until each letter is connected to every other letter.



Some students will see the listing and diagramming as unnecessary. They may say, "Each of eight people shake hands with seven other people, so there are 7 times 8 or 56 handshakes." Some students that use this approach may overlook the fact that 7 times 8 counts *A*'s shake with *B* and *B*'s shake with *A* as two different elements. Other students will realize this and divide 56 by 2 to get the correct answer, 28.

Students should be encouraged to try whatever method they wish. They soon look for the easiest and fastest approach.

Going Beyond:

1. What were all the different methods used by class members to solve this problem?
2. After seeing these methods, which do you think is fastest?
3. If the problem had involved 100 people instead of eight, which method would be fastest? $\left(\frac{100 \times 99}{2}\right)$

DRAW ONE

What are the chances of drawing a red card from a regular 52-card deck of playing cards? What are the chances of drawing a spade? A 5? A black 3? A 7 of clubs?

DRAW ONE ANSWERS

Answers: Red Card: 1/2
Spade: 1/4
5: 1/13
Black 3: 1/26
7 of clubs: 1/52

About the Problem:

A good deal of the mathematics we use in our daily lives involves chance. Although students are often not given formal definitions of probabilities, they are usually familiar with ways to express chance from weather reports, sporting events, elections, and other events.

It is assumed that all students are familiar with a standard 52-card deck of playing cards.

Getting Started:

If students are *not* familiar with standard playing cards, the following questions may help.

How many suits are in a deck of cards?

What are the suit names?

What cards are in each suit?

How do we express chances? (____ out of ____, as a fraction, a ratio or a percent)

Solution:

A. There are 13 hearts, 13 diamonds and 52 cards altogether, so the chances of drawing a card of a red suit are 26 out of 52 or 26/52 or 1/2.

B. There are 13 spades, so the chances of drawing a spade are 13 out of 52 or 13/52 or 1/4.

C. There are four 5s, one in each suit, so the chances of drawing a 5 are 4 out of 52 or 4/52 or 1/13.

D. The only two black 3s are the 3 of clubs and the 3 of spades, so the chances of drawing a black 3 are 2 out of 52 or 2/52 or 1/26.

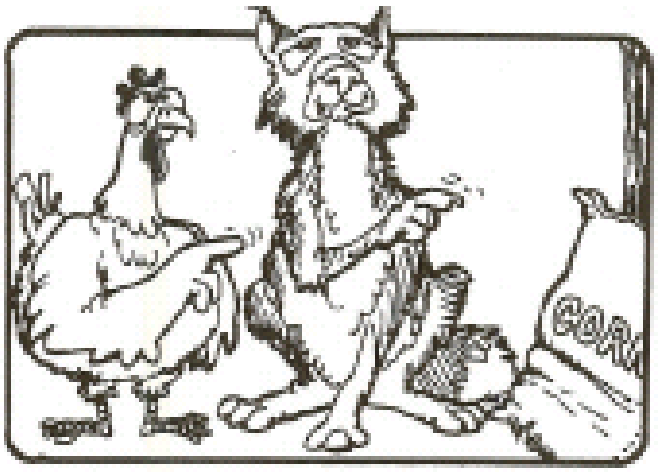
E. Since there is only one 7 of clubs, the chance of drawing it is 1 out of 52 or 1/52.

Going Beyond:

1. The chances of an event occurring are often referred to as a probability. What is the probability of drawing a face card, that is, a King, Queen, or Jack? (3/13)
2. What is the probability of drawing a card less than 6? Assume that Ace is high. (4/13)
3. If you are trying to draw an Ace from a full deck, and you don't succeed on the first draw, what are the chances on the second draw if you don't replace the first card you drew? (4/51)

CANOE SOLVE THIS?

A woman wants to take her fox, chicken, and bag of corn across the river in her canoe. The canoe can hold only one thing in addition to the woman. If left alone, the fox would eat the chicken, or the chicken would eat the corn. How can the woman take everything across the river safely?



CANOE SOLVE THIS? ANSWERS

Answer: See the Solution section.

About the Problem:

This classic problem involves logic and some diagramming. It is a good idea to read the problem through more than once. The problem, already long and wordy, assumes that the fox doesn't like corn.

Students should not "think out loud" or attempt to explain the problem before others have had a chance to quietly work through the problem themselves. Often a person solves a problem correctly, but gets confused trying to verbalize the solution. Have students write down the solution and check it carefully before explaining.

Getting Started:

Students will probably find that a series of pictures will help them keep track of the steps. Moving scraps of paper labeled chicken, fox, corn will help simulate the situation.

Which two things can be left together, if any?

Must the woman always carry something in the boat?

Can she take something back with her?

Solution:

Let *Ch*, *F*, and *C* represent the chicken, fox, and corn. The arrow indicates the direction in which the woman is rowing across the river.

There are two solutions.

F, C	*Ch* →					*F, C*	*Ch* →				
F, C	←	*Ch*				*F, C*	←	*Ch*			
C	*F* →	*Ch*				*F*	*C* →	*Ch*			
C	← *Ch*	*F*				*F*	← *Ch*	*C*			
Ch	*C* →	*F*	or			*Ch*	*F* →	*C*			
Ch	←	*F, C*				*Ch*	←	*F, C*			
	Ch →	*F, C*					*Ch* →	*F, C*			
		F, Ch, C						*F, Ch, C*			

Going Beyond:

1. Is it easier to explain the solution when looking at notes? (Seven steps are difficult to keep clear in your head when explaining the problem.)
2. This problem shows the value of careful recording when many steps are involved.

THANK YOU

✓Ms. Mikulik

✓Ms. Callier

✓All Our Amazing Teachers and Staff

✓PTA Board

✓PTA Members

✓Rollingwood Families