CONTIG

Appendix A

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	44	45	48	50	54	55
60	64	66	72	75	80	90	96
100	108	120	125	144	150	180	216

Contig Help students to automate math operations. [Game board: appendix A]

Procedure:

1. Equipment needed: 3 dice, score sheet, Contig board
2. Two to five players may play.
3. To begin play, each player rolls the three dice and determines the sum of the the three numbers showing. The player with the smallest number begins play. Play then progresses in a clockwise direction.
4. The first player rolls the three dice. He must use combine the three numbers shown using the four arithmetic operations. He then covers or marks the resulting number on the board. He scores one point for the number he covers.
5. The next player rolls the dice and combines the three numbers. A player must use the numbers on all three dice and is limited to one minute to determine his answer. A player may not mark a number that has been previously marked.
6. A player scores one point for the number he marks and an <u>additional</u> point for each previously marked number that is contiguous (adjacent vertically, horizontally, or diagonally) to the number he marks.
7. During a player's turn, any of the other players who sees an answer may call out "Contig." If the player whose turn it is fails to produce an answer within his time limit, the first player who called "Contig" is allowed to cover a number and score the resulting points. This does not affect the order of players' turns.
8. A cumulative score is kept for each player. A player is eliminated from play when he fails in three successive turns to produce a number that can be covered. When all players have experienced three successive failures to produce a number, the game ends. (variations: end after two successive failures or an established time or number of rounds.)

[Broadbent, Frank W. "Contig: A Game to Practice and Sharpen Skills and Facts in the Four Fundamental Operations." *The Arithmetic Teacher*. May, 1972, pp. 388-390.]

Appendix B

Backyard Math (two sample activities)

Sample 1

1. How many gallons of green paint would be needed to paint the NBBC sign in front of the building (front side only) if one gallon covers 80 square feet? Calculate to hundredths of a gallon.
2. What would be the length of the shadow of the NBBC sign when the sun was 30 degrees above the horizon?
3. What is the height of the light pole behind the building if its shadow is 28.6 feet long when the sun is 40 degrees above the horizon?
4. How many times can the tetherball rope wrap around the pole before it is tight? (Calculate theoretically, not experimentally.)
5. If a first-grade girl is sitting on the teeter-totter (end furthest south), how many times must she go up and down before she has traveled one mile?
6. If a third-grade boy is sitting in the swing furthest to the west and you push him hard enough to go completely over and around the swing set, how far does he travel in one revolution, assuming the chains remain taut? (Calculate theoretically, not experimentally.)
7. If a swimming pool were built over the basketball pad and filled with five feet of water, how many cubic feet of water would be in the pool?

Sample 2

1. Using external measurements of the building, calculate the volume of the storage building, including the space between the ceiling trusses and roof.
2. Calculate the length of the steps that lead up to slide without measuring the steps themselves. Include a diagram of what you measured.
3. Calculate the number of cubic yards of cement in the smaller pad, if the pad is an average of 4.5 inches deep.
4. Calculate the volume of one of the propane cylinders (in cubic feet). The formula for the volume of a sphere is $\frac{4}{3}\pi r^3$.
5. **Calculate** (do not measure) the straight-line distance from the top of the tetherball pole to the end of its shadow.
6. Calculate the number of times a front wheel on the yellow bus revolves as the bus travels one mile.

Appendix D

A Starter Kit of Problems to Solve

1. A whole number was multiplied by 3 and then by 4. The result could be
   a. 26 b. 92 c. 60
2. The square of 1/3 equals the square root of - -.
3. I have $1.15 in American coins, yet I cannot make change for a dollar bill, a half dollar, a quarter, a dime, or a nickel. What are the coins I have.
4. If F is the midpoint of $\overline{GH}$ and H is the midpoint of $\overline{FK}$, then what percent of $\overline{GK}$ is $\overline{GF}$?
5. If the volume of cube A is 91 in^3 more than the volume of cube B, and the volume of cube B is 125 in^3, what is the length of one edge of cube A?
6. Karen has 5 ribbons pinned in a line on her bulletin board. Each is a different color. How many ways can she arrange the ribbons (in a straight line)?
7. A rectangle and a square are inscribed in congruent circles. The rectangle has a width of 3 and a length of 4. Find the area of the square.
8. A rectangle is divided into two square by a line segment joining two of its opposite sides. If the area of a one square is 36, find the perimeter of the rectangle.
9. If $r(x)$ means the reciprocal of x, find the value of x which satisfies $r(x) = r(2) + r(3) + r(6)$.
10. Two vertical trees, of heights 10 and 15, are opposite each other, one on each side of a flat road. The distance between the bases of the trees is 25. A bird sits on the top of each tree. Both sight a worm somewhere between the bases of the two trees. At the same time, and with equal speeds, they both dive directly for the worm, reaching it simultaneously. Find the distance from the worm to the foot of the taller tree.
11. A yacht is tied to a pier in Norfolk harbor. A steel ladder is permanently attached to the side of the ship and extends from the deck rail down into the water. The steps of the ladder are exactly 12 inches apart. At low tide, three steps on the ladder are under water and twelve steps are above the water. At high tide, the water level was six feet higher at the pier than it was at low tide. How many steps on the ladder were under water at high tide? (Answer: ship rises with water)
12. Megan wants to pile grapefruits in a store display in the form of a pyramid. She places 1 on the top layer, 4 in the second layer, 9 in the third layer, 16 in the fourth layer, and so on. How many layers will she have if she uses all 385 grapefruits?
13. A woman has some cows and some chickens. Together the animals have a total of 54 legs. How many cows and how many chickens might she have?
14. There are 16 football teams in the National Football League. To conduct their annual draft, teams in each city must have a direct phone line to each of the other cities. How many direct telephone lines must be installed by the telephone company to accomplish this? Suppose the league expands to 24 teams?
15. The driver of a taxicab loved problems, so when Larry asked him for his number he replied, "Work it out for yourself. If you divide my number by 2, 3, 4, 5, or 6 you will find there is always a remainder of 1; but if you divide it by 11 there is no remainder. What's more, there is no other driver with a lower number who can say the same." What was his number?
16. Three chickens and one duck sold for as much as two geese; one chicken, two ducks, and three geese were sold together for $25. What was the price of each bird in an exact number of dollars?

Train Switcheroo

The cars and the engine move as real trains do. The engine can push and pull either or both cars. Only the engine can fit through the tunnel. Exchange the positions of Car A and Car B. The engine must begin and end at the car barn.