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Job Cards and Other Activities

Introduction. This Appendix gives some examples of the types of *Job Cards* and games that we used at the Saturday Clubs. We usually set out one type of card per table, along with an array of material that might be useful tools for solving the problems detailed on the cards. At times, we included extension activities and questions that helped prolong the math exploration.

What Is Your Name Worth?

If A = one penny, B = two pennies, etc., what is your first name worth?

What is your last name worth?

How did you figure it out?

What is the most expensive name you can think of?

Think of a name that costs exactly forty-three cents!

Can you think of any variations on this?

Write a Story for . . .

1. Write a story for this number sentence:

   0 - 3 = -3

2. Now draw a picture to go with your story!

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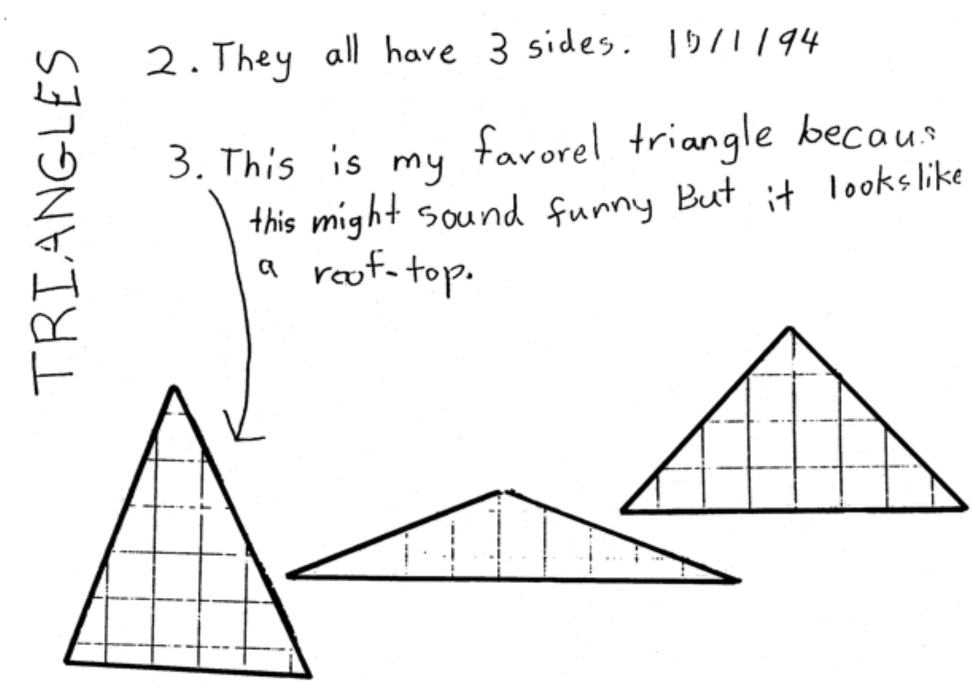
Triangles!

1. Draw 3 different kinds of triangles.

2. What makes them all triangles?

3. Which triangle is your favorite one?
   Do your classmates agree?



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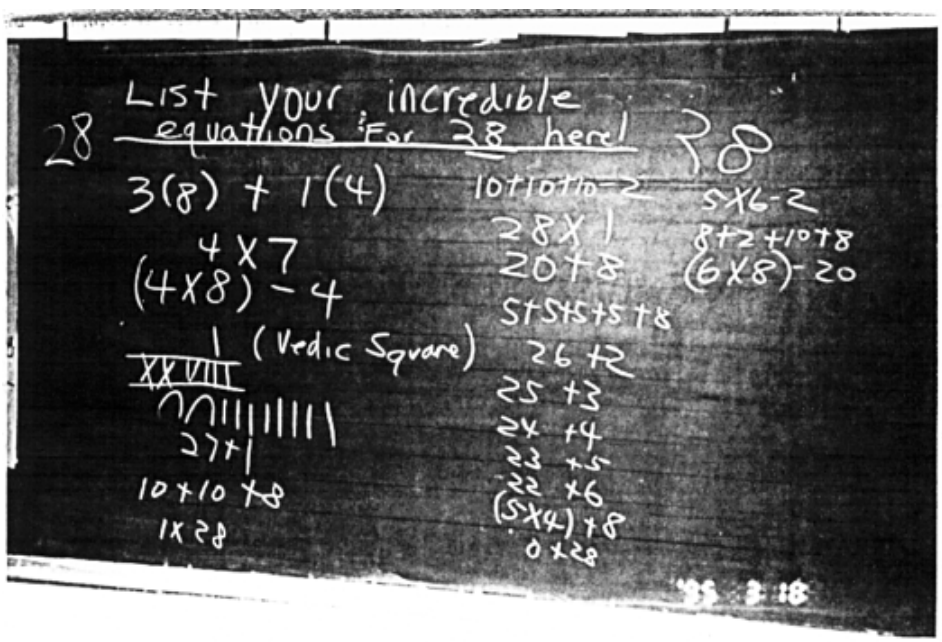
Incredible Equations

Take a number like 28 and see how many equations you can write that will have that answer.

Challenge: Making equations make sense.

Make up interesting equations that at first glance don't make sense because we need to think first about the units involved. For example, in what way is **5 + 5 = 2** true? How about **1 - 1 = 59**?



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Pentominos

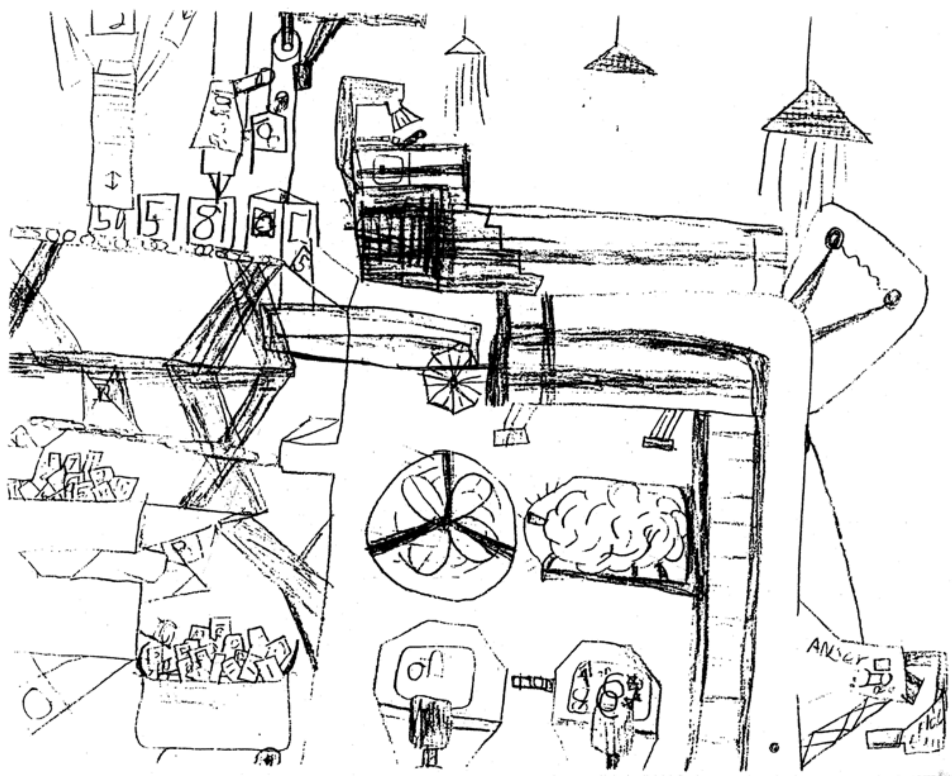
Take five tiles and arrange them in as many different ways as you can, making sure that at least two tiles share a side.

Rotations don't count as a different arrangement.

Draw each arrangement you make on a piece of graph paper.

How many arrangements did you make all together?

Name each arrangement!



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Switching Places Boat Problem

First, draw three circles big enough to fit color tiles on to:

O O O

Take 1 blue and 1 yellow tile and place them on the two outside circles. Imagine that the paper is a boat with three places, and the blue person wants to switch places with the yellow person. They can only switch by moving one position at a time, and in one direction. They can also jump over one person, but only one of an opposite color.

After you have figured this out, draw 5 circles and use two blue and two yellow tiles, leaving the middle circle blank.

Record how many moves it takes to switch sides.

Try this game with 7, 9, and 11 circles.

Record the following information in a table: Places in the boat. How many moves it took to switch places. Do you notice any patterns?

What's Your Pattern Worth?

1. Make a pattern with your pattern blocks.

2. Figure out how much your pattern is worth:

Cost of Shapes:

triangles = $1	squares = $2
parallelogram = $3	rhombus = $1
trapezoid = $4	hexagon = $5

Challenge: Can you make a shape that is worth $23?

What is the most expensive hexagon that you can make?

Pattern Block Fractions

Hexagons =	1 whole
Triangles =	1/6
Parallelograms =	1/3
Trapezoids =	1/2

Using only the above blocks, make a design and figure out how much it's worth.

How did you add and keep track?

How Many Different Kinds of Rectangles Can You Make With 12 Cubes or Tiles?

1. Make as many different rectangles as you can and record each one.

2. Describe each recording by saying how many cubes long, and how many cubes wide.

Now try it with 24 cubes.

Now try it with 19 cubes.

(And any other number that you like)

What did you discover from doing this activity?

Rectangle Hunt

Go on a rectangle hunt around the room.

Record the number of rectangles that you find, and their measurements.

Or, use graph paper and draw the rectangles to scale (for example each inch = 1 box).

Which rectangle(s) do you like best?

Why?

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Golden Rectangles

1. Using graph paper, make a 13 x 21 rectangle.

2. Make the largest square you can in the rectangle (using the left side of the rectangle as one of the sides).

3. Going counter-clockwise, continue to make the largest square you can in the leftover part of the rectangle.

4. What is the size of each square?

5. Can you find the pattern in this sequence?

6. Draw diagonals, starting at the bottom left hand corner, through each of the successively smaller squares, using a continuous line.

Math Balance

1. Using a math balance, find three ways to balance the number 35 (3 tens and a five).

2. What can you say about the four different ways to make 35?

3. Make up problems and solve them.

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Hexagon Game

Materials: Triangles, trapezoids, parallelograms, and hexagons from Pattern Block Sets are used for this trading game that involves fractions and congruency. One die, numbered 1 through 6, or a die marked with fractions (1/2, 1/3, 2/3, 1/6, 5/6 and 1).

Object of the game: To make as many hexagons as possible during the length of the play.

Playing the game: Triangles are the unit for this game, thus, the number rolled tells how many triangles or their equivalent to take. For example, if a three is thrown, the player can choose three triangles, a parallelogram and a triangle, or a trapezoid. On the next turn, a four is thrown. Now, the player can choose four triangles or two parallelograms or a trapezoid and a triangle. He/she can then figure out how to form a hexagon using the pieces he/she has. He/she will have a hexagon and one triangle left over.

Note: Prior experience with making hexagons from different combinations of pattern blocks is necessary.

This game works well done cooperatively. The group challenge is to fill a honeycomb pattern made by tracing hexagons on a piece of paper.

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Measuring Angles with Pattern Blocks

Prior experience: Unstructured "play time" with pattern blocks, exploring how they fit together.

1. Start off by asking: "Why do pattern blocks fit together so well?" List their ideas on the board, using their language.
2. Drawing on what the children say, introduce the idea of angle and draw an angle, mentioning how angles encompass both corners and sides.
3. Show them the various pattern block pieces and point out some of the angles. Ask: "What do you notice about the different angles?" List their ideas on the board.
4. Ask how they might categorize the different angles that they see.
5. Tell them that there is a way to measure angles; draw an angle on the board and show the area that is measured.
6. Hold up a square piece and ask them what they think about that angle. Tell them the angles on a square are right angles and measure 90 degrees. Ask them where they see right angles and why they are so prevalent (this should lead to a discussion of art, architecture, and nature). You might use their discussion of right angles to categorize angles as smaller than or larger than right angles (acute or obtuse).
7. Now, ask them to find out what all the angles on the pattern blocks measure (either working in pairs or in groups) using the information that a right angle measures 90 degrees. Tell them they must record each shape (have templates available) and show what each angle measures, and how they figured it out. (Give out a set of pattern blocks to each pair or group.) Before they start, ask: "Are all the angles in a shape the same?" Discuss the fact that they aren't all the same, so sometimes they'll need to figure out more than one angle for a shape.
8. If some children finish earlier, tell them to go on to figure out how many degrees are in the entire shape (by adding the degrees from each angle in the shape).
9. Discuss findings/strategies with the whole group. Have them show on the overhead with overhead pattern blocks.
10. Make a chart with the number of angles and the number of total degrees.
11. Fill in some of the holes on the chart by having them construct and figure out the degrees in a pentagon, a septagon, an octagon, etc.
12. When all the numbers are up there and discussed, have them find the pattern.

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Lots of Boxes

Object of the game: This is a game for two people. The idea is to make a bigger rectangle than your partner.

Directions:

1. Each partner takes a piece of grid paper and a pencil.

2. One person takes the die and throws it. The number on the die tells you how *long* your rectangle will be. Now draw it. Then you throw the die again, and that will tell you how *high* your rectangle will be. Now draw it, and finish your rectangle. How many little boxes are in your rectangle? That's your score. Write it down.

3. Now it's your partner's turn to do the same.

4. Whoever has the bigger score, wins.

Play as many times as you like!

Questions to ask:

1. How did you figure out how many little boxes were in your rectangle?
2. Could you find an easier way to figure it out?
3. Could you write a number sentence to show how many little boxes there are altogether?
4. What's the smallest rectangle you could make by throwing the die twice?
5. What's the biggest rectangle you could make?

Challenges:

1. Use two dice each time you throw!
2. Devise two ways to figure out how many squares there are in your box.
3. Write number sentences or equations for each way.
4. Write a formula for finding out how many squares there are no matter what you roll.