Comprehensive School Mathematics Program

a-blocks
string game

a guide to using a classification game in the classroom

For additional information, contact:
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A-BLOCKS STRING GAME INTRODUCTION

A *CSMP* Mini-Package

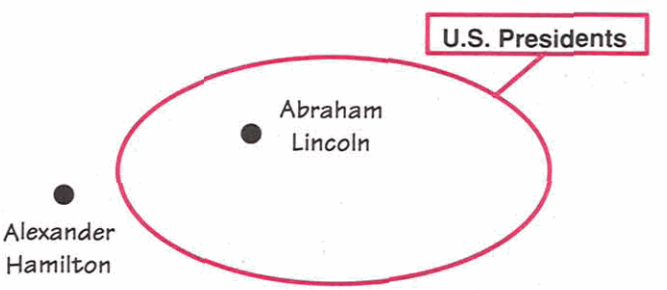
The *CSMP* Mini-Packages present parts of the *CSMP* curriculum through introductory lessons that can be taught by teachers with no prior *CSMP* training to students with no *CSMP* background. The purpose of each *CSMP* Mini-Package is twofold:

- to introduce you to one or more of the non-verbal languages and instructional tools used in the *CSMP* elementary curriculum so that you can pursue the possibility of implementing the entire curriculum; and
- to provide some mathematically rich activities that you can use immediately in your own classroom.

This *CSMP* Mini-Package introduces the language of strings through the String Game with A-blocks.

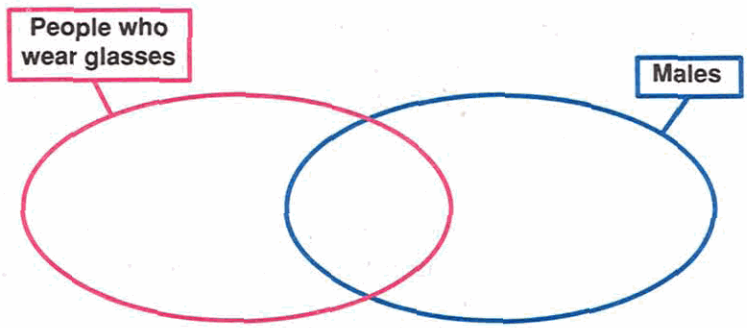
Classification and the Language of Strings

As the word implies, classifying means putting things into classes, or as mathematicians say, sets. The basic idea is simple. Given a set S and any object x, either x belongs to S (x is in S) or x does not belong to S (x is not in S). We can represent this simple act of sorting—in and out—by using string pictures. In a string picture, objects to be sorted are represented by drawing closed curves (strings) around dots. A dot inside the region delineated by a set's string is for an object in the set and a dot outside a set's string is for an object not in the set. For example, consider the set of U.S. Presidents. Abraham Lincoln belongs to that set, but Alexander Hamilton does not. The string picture below records this information in a precise and clear fashion.

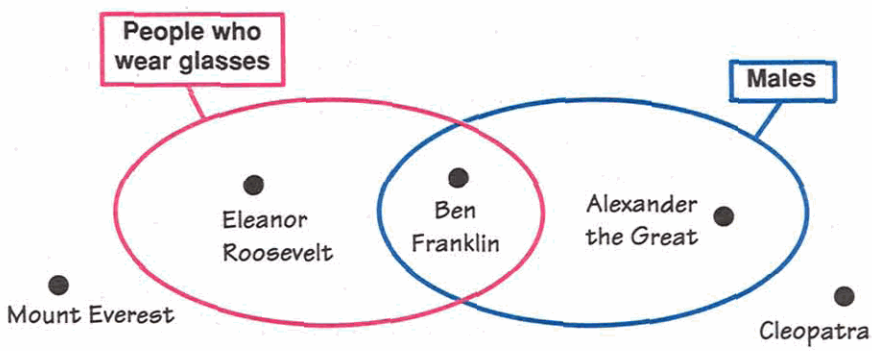


The situation becomes more interesting when we are sorting with respect to more than one property; that is, when we are putting things into several sets, because then we can study the relations between sets. Suppose we consider

the set of people who wear glasses and the set of males. We draw two different colored strings partially overlapping each other.



Now the classification scheme must be concerned with two in-out decisions simultaneously. The illustration below shows where Eleanor Roosevelt, Benjamin Franklin, Cleopatra, Alexander the Great, and Mount Everest belong in this string picture.



Note that every object in the world has a place in this picture.

The String Game and *CSMP*

To gain students' interest in the language of strings, the *CSMP* developers set out to create a game situation that would involve classification. They started with a set of attribute blocks (A-blocks) of varying shapes, colors, and sizes—attributes that are well-defined and familiar to elementary school students. After trying various formats, the String Game you are about to be introduced to met with tremendous success in pilot classrooms. Since that time the String Game has become a major tool in the *CSMP* curriculum for developing logical and strategic thinking.

The String Game is designed to be played with a class divided into two or more teams and the teacher. The game is played with either a two- or three-string picture whose labels are known to the teacher but hidden from the players. Starting with a collection of game pieces, each team's goal is to place its share of A-blocks correctly in the string picture and to identify the string labels. A game lasts approximately twenty minutes. See the Appendix for a complete list of the game rules.

In the *CSMP* curriculum for the first grade through the beginning of the fourth grade, the String Game is played with A-blocks; versions increase in sophistication as the students' familiarity with the game grows. In the fourth through sixth grades, the same basic game is played only with sets of numbers and strings labeled with properties of numbers; for example, one string might be for multiples of 3 and the other for numbers greater than 50. Not only does playing the String Game with numbers further develop students' analytic reasoning skills, it also aids in developing their understanding of numerical concepts such as multiples, divisiors, primes, and order.

This booklet will introduce you to the String Game with A-blocks and suggest how to introduce this game to your students.

Five Activities and How to Use Them

This booklet will describe five String Game activities:

- **Activity 1** introduces A-blocks and a simple version of the String Game (Version A) . We suggest that you play this version many times before proceeding to Activity 2. In doing so, your students will become thoroughly acquainted with the A-blocks and the basic rules of the String Game.
- **Activity 2** introduces "not-cards" to the String Game. A string labeled with a not-card is for A-blocks that do *not* have a particular color or shape; for example, a string labeled **NOT RED** is for the A-blocks that are not red. The game increases in sophistication with these additional possibilities for string labels. We suggest that you play the String Game with not-cards included (Version B) many times before proceeding to any of the other three activities.
- **Activity 3** introduces three-string pictures to the game. After an introductory three-string game, we suggest you vary the kind of string games you play thereafter, sometimes playing with two strings and sometimes playing with three.

- **Activities 4 and 5** are examples of the analysis exercises which can be found throughout the *CSMP* curriculum. These activities are for students who have played the String Game many times and are ready to begin discussing the kinds of thinking involved in making a good play.

These five activities are written in the standard *CSMP* format of a dialogue between teacher (T) and students (S). We hope that the String Game will provide you and your students with a setting in which to share the joy which comes from developing logical and strategic thinking.

For Further Information

The language of strings is one of the non-verbal languages of the *CSMP* curriculum. This *CSMP* Mini-Package details only one context in which the language is used and gives a preview of *CSMP*'s unique approach to mathematics at the elementary school level. For more information, contact:

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A-BLOCKS STRING GAME ACTIVITY 1

Note: Before conducting these activities, read the Appendix for a description of the necessary equipment and its preparation.

Preparation for the String Game

Put the 24 A-blocks into a box about the size of a greeting card box. Sort them so that you can locate any given one quickly.

T: ***In this box I have some cardboard pieces in different shapes, colors, and sizes. What different shapes do you think I have?***

S: ***Circles.***

T: ***Yes, I have some circles.***

S: ***Rectangles.***

T: ***Yes, I have some rectangles, but they are a special kind of rectangle.***

S: ***Squares!***

T: ***Right, I have some squares.***

S: ***Triangles.***

T: ***Yes, I have some triangles.***

When your class has guessed all three shapes, tell them that these are the only shapes the pieces have.

T: ***What different colors do you think the pieces are?***

S: ***Red.***

T: ***Yes, some of the pieces are red.***

S: ***Brown.***

T: ***No, there no brown pieces.***

Continue until the class has guessed the four colors.

T: ***There are two different sizes. What do you think they are?***

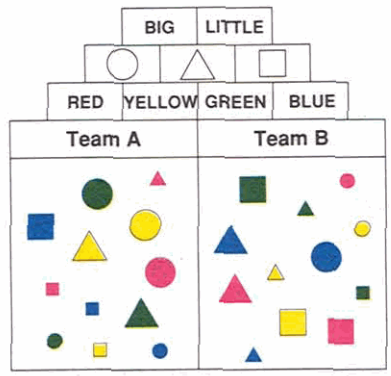
S: ***Big and little.***

Tell the students that you are going to show them how to play a new game and divide them into two teams.

Tape a copy of the A-Blocks String Game poster (Version A) above the team board. This game can easily be adapted for three or four teams rather than two teams.

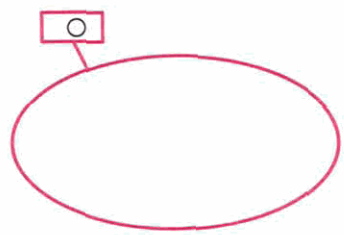
T: ***Our first task will be to divide the pieces between the two teams. Someone on Team A will tell me a piece to put on Team A's side of the board, and then someone on Team B will tell me a piece to put on Team B's side. The teams will continue taking turns choosing pieces until all the pieces are out of this box.***

Alternating teams, let students describe pieces to put on the team board. Insist that descriptions be complete; a student describing a piece should say its color, shape, and size. If a piece described is already on the board, point it out and ask for another piece. Encourage students to be thinking about which pieces they will ask for when called upon. The next illustration shows one possible distribution of the game pieces.



T: ***First we'll play a warm-up game in which you know what the string labels are.***

On the board draw a large red string and label it ○ for circles.

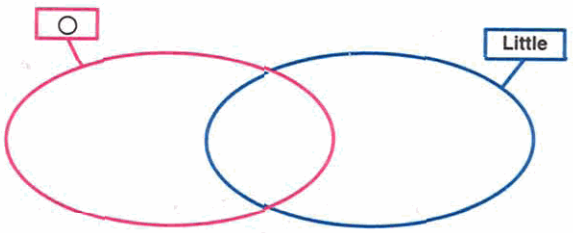


T: ***The red string is for circles. Only pieces that are circles belong inside this string. All other pieces belong outside the string.***

Take several pieces, one at a time, from the team board and ask whether each belongs inside or outside the red string. Return each piece to the side of the team board from which it was taken.

Draw a large blue string overlapping the red string and label the string **LITTLE**.

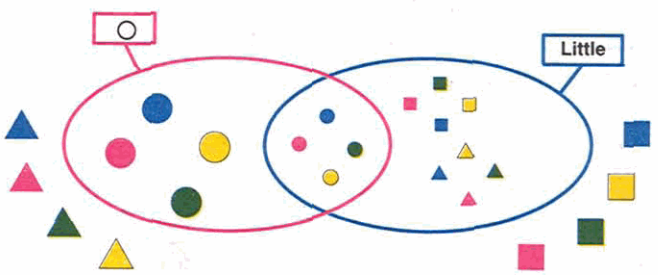
T (drawing the blue string): ***This blue string is for little pieces. Any piece that is little belongs in this string.***



T: ***Now teams take turns trying to place their pieces correctly in the string picture. When it is your turn, select one piece from your team's side of the board and put it where you think it belongs in the picture. If you place it correctly, I will say yes. If you place it incorrectly I will say no and you must return the piece to your team's side of the board. The first team to place all of its pieces correctly in the string picture wins.***

Play this game alternating teams and alternating turns among the members of a team.

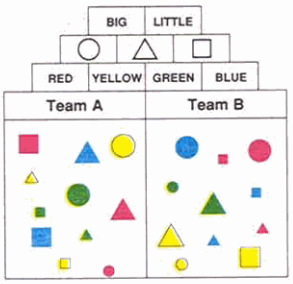
The next illustration shows the correct placement of the 24 game pieces.

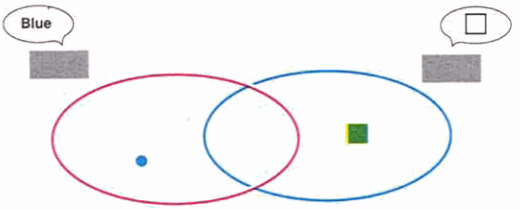


Note: This warm-up game can just as easily be played cooperatively; that is, students can be given an opportunity to place game pieces of their choice in the picture. The class can help judge placement.

The A-Blocks String Game (Version A)

Distribute the A-block pieces evenly between the two sides of the team board. (Again, the game can easily be adapted for three or four teams rather than two.) Place the string card **BLUE** facedown near the red string and place the string card □ facedown near the blue string. Let each team select an A-block piece for you to place correctly in the picture as starting clues. For example:



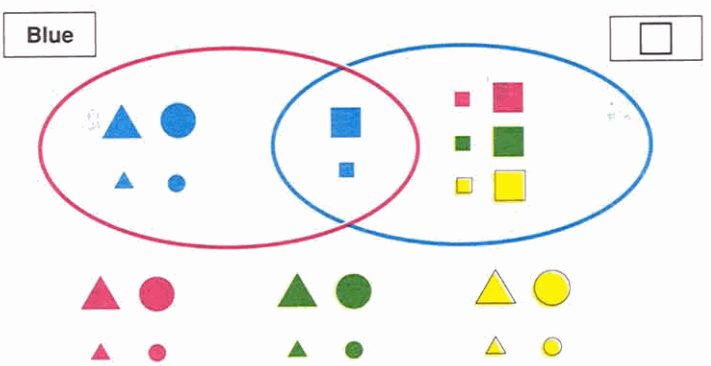


T: ***This time we'll play the game with the string labels hidden. Teams will take turns guessing where their team's pieces belong. We'll play with a "bonus" rule: if you place a piece correctly, you get another turn. After placing two pieces, though, it is the other team's turn, even if you are correct both times.***

When a team has correctly placed all of its pieces, the player who placed the last piece can guess what the strings are for. If the player gives the correct labels for both strings, that team wins. If both or one (and I won't tell you which one) is incorrect, we continue with the other team's turn.

Begin playing the game. If a student correctly places a piece, say yes and allow the piece to remain in the picture. Then give the student a bonus turn. If the piece is placed incorrectly, say no and return it to the team board.

Continue until a team has correctly placed all of its pieces and has correctly identified both strings. To assist you in the judging, the correct placement of the 24 game pieces is shown below.



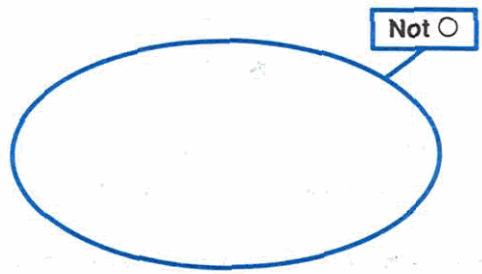
Introduction to Not-Cards

With the class, quickly review the attributes of the A-blocks, that is, their sizes, colors, and shapes.

Draw a blue string on the board.

T: ***I'm going to show you some other possibilities for string labels.***

Show the class the **NOT** ○ card and label the string with this card.



T: ***If this string is for not circles, what would be a piece that goes inside the string?***

S: ***The small red square.***

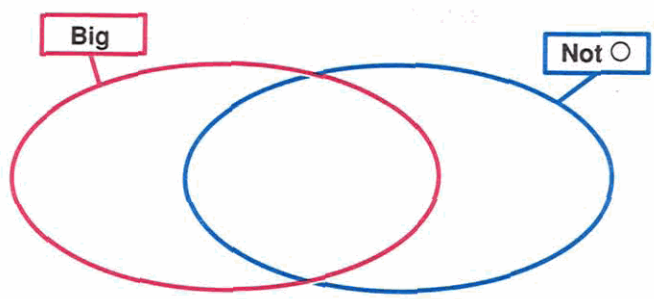
T (putting the piece inside the string)**:** ***Yes, this piece is not a circle. What would be a piece that goes outside the string?***

S: ***The large blue circle.***

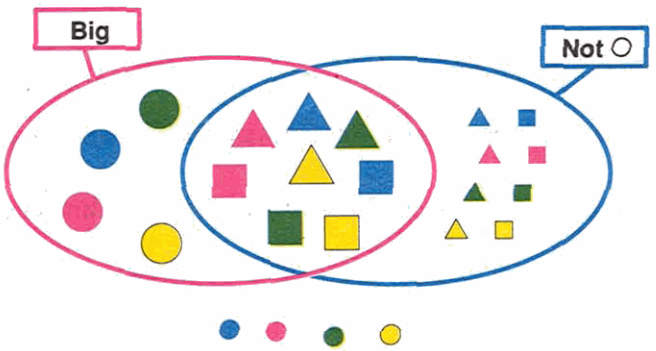
T (putting the piece outside the string)**:** ***Yes, circles go outside the string.***

Let several other students suggest pieces that go inside the string and pieces that go outside the string.

Then clear the picture of all game pieces and draw a red string overlapping the blue string. Label it **BIG**.



Call on students to place several game pieces of their choice in this picture. Discuss with the class why each placement is correct or incorrect, as the case may be. For your information, the following picture shows correct placement of the 24 game pieces.



After several pieces are in the picture, at least one in each region, clear the picture of all game pieces and erase the string labels.

T: ***What other new string labels do you think there are?***

Show the class each string card as it is mentioned.

Note: If a student mentions **NOT LITTLE** or **NOT BIG**, discuss why such string cards are not needed. Pieces that are not little are the same as those that are big, and pieces that are not big are the same as those that are little.

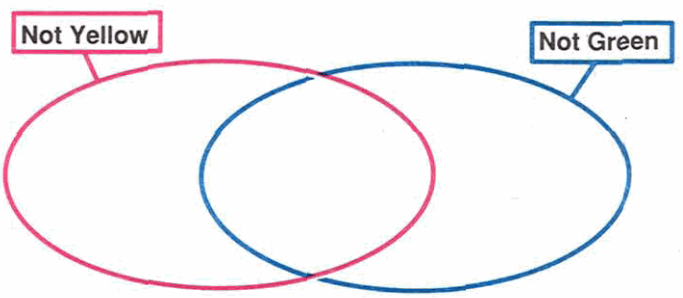
Tape a copy of the A-Block String Game poster (Version B) above the team board. Again, the game can easily be adapted for three or four teams rather than two.

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

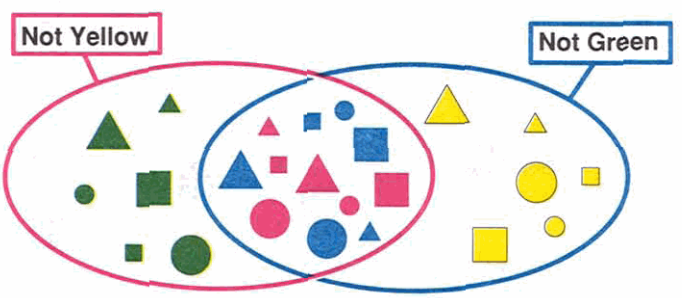
Team A	Team B

T: ***Now, when we play the String Game, we have all of these possibilities for the string labels. Before we play an actual game, let's play a warm-up game in which you know what the string labels are.***

Divide the class into two teams, Team A and Team B. Distribute the game pieces on the two sides of the team board. Label the strings as shown below. Since the labels are visible, no starting clues are necessary.



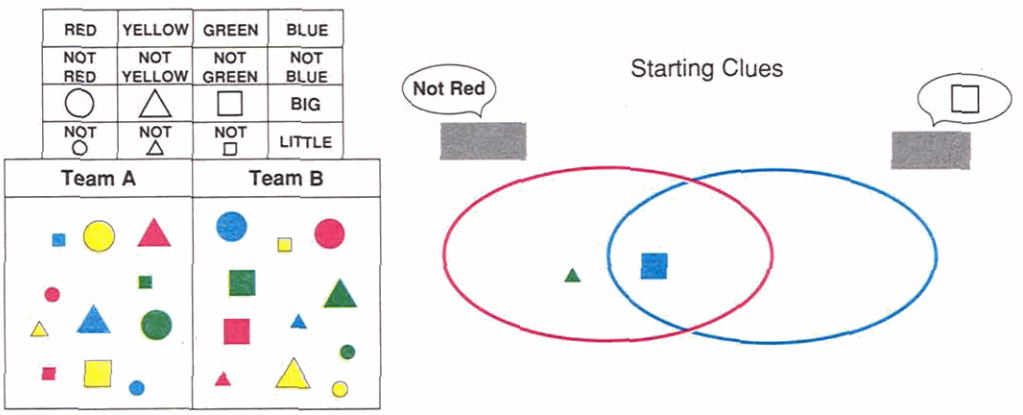
Let the teams take turns placing their respective pieces in the picture. If a piece is correctly placed, say yes and let the piece remain in the picture. If a piece is incorrectly place, say no and ask the student who made the play to return the piece to the team board. The first team to place all of its game pieces correctly wins. For your information, correct placement of the 24 game pieces is shown below.



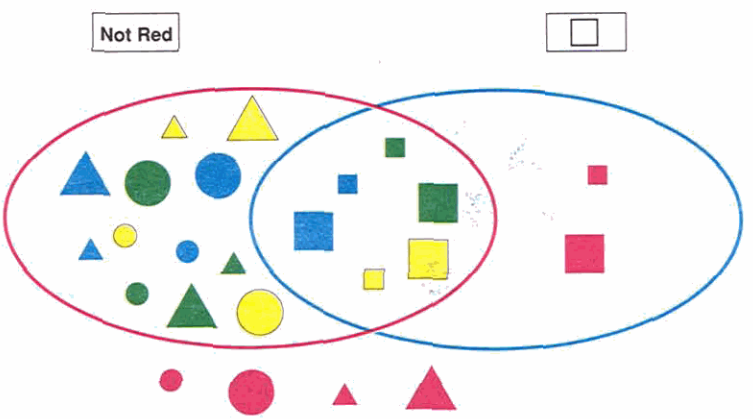
Note: This activity can just as easily be played cooperatively rather than as a team game; that is, students can be given an opportunity to place game pieces of their choice in the picture. The class can help judge placement.

The A-Blocks String Game, Using Not-Cards

Play the String Game with facedown string cards as described in Activity 1, only this time include the not-cards. Tell your class that there are sixteen possibilities (point to the poster) for each string. The first illustration suggests a choice of string labels (indicated in the bubbles) and appropriate starting clues for a game. The second illustration shows correct placement of the 24 game pieces.



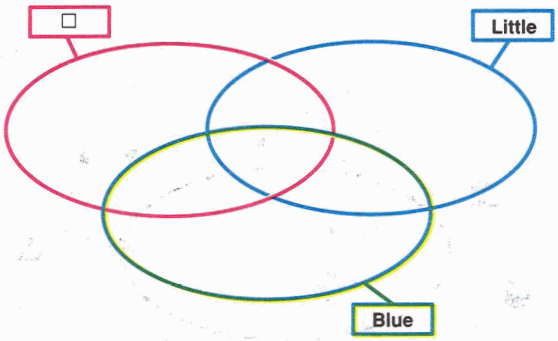
Correct Placement of Pieces



A-BLOCKS STRING GAME ACTIVITY 3

Introduction to Three-String Pictures

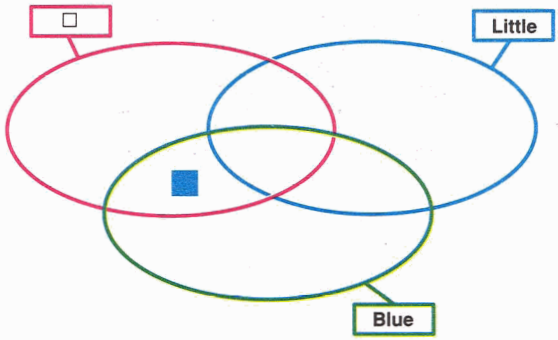
Display the A-blocks and draw this string picture on the board.



Trace each of the three strings as you read its label. Then point to any one of the regions in the picture† as you ask,

T: ***Who knows a piece that belongs here?***

Check a student's choice by considering each label. For example, suppose a student places the large blue square here (see the next illustration).



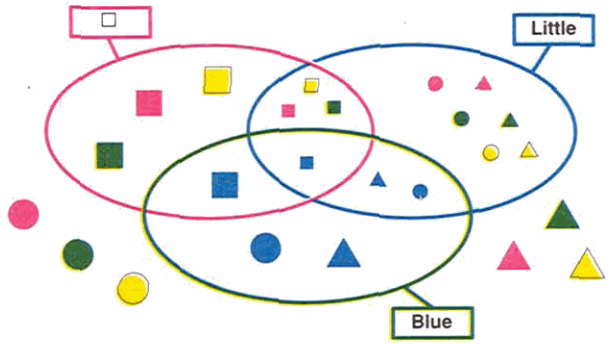
T (pointing to the string labels, one at a time): ***Is this piece a square?*** (Yes) ***Is it blue?*** (Yes) ***Is it little?*** (No) ***So it belongs inside the red and green strings but outside the blue string.***

Repeat this activity with three or four other regions. If someone chooses a piece that does not belong in the region being considered at the time, the class should notice the error. Lift the piece from the picture and ask where it does belong in the picture.

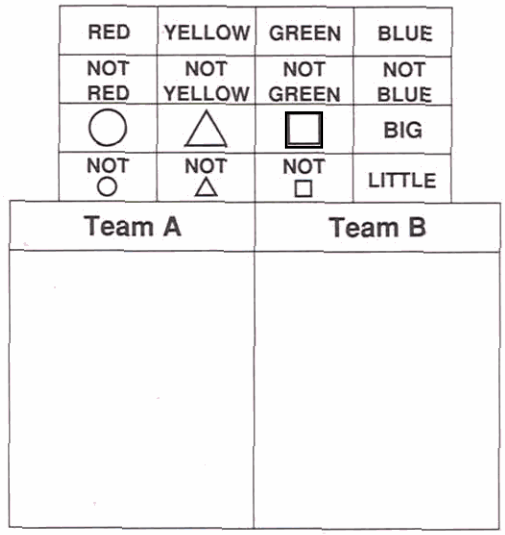
†There are pieces that belong in each of the eight regions of this picture. This is not true for all choices of string labels. See the Appendix for examples of two- and three-string pictures in which one or more regions are empty.

Next, hold up some of the pieces that are not yet in the picture. Ask where those pieces belong.

Although your picture might only have about six to nine pieces in it, correct placement of the 24 game pieces is shown below.

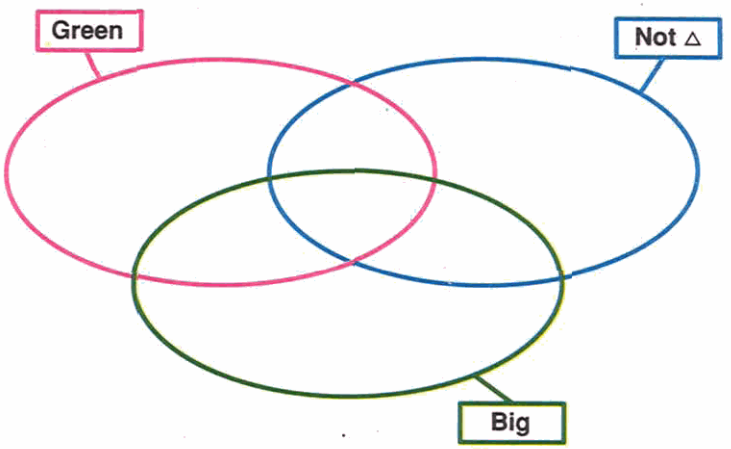


Tape a copy of the A-Blocks String Game poster (Version B) above the team board. Again, the game can easily be adapted for three or four teams rather than two.

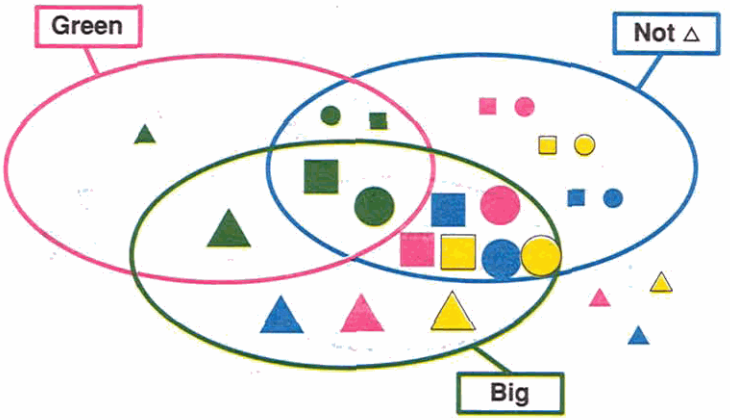


T: ***Before we play an actual game with a three-string picture, let's play a warm-up game in which you know what the string labels are.***

Divide the class into two teams, Team A and Team B. Distribute the game pieces on the two sides of the team board. Label the strings as shown below. Since the labels are visible, no starting clues are necessary.



Let the teams take turns placing their respective pieces in the picture. If a piece is correctly placed, say yes and let the piece remain in the picture. If a piece is incorrectly placed, say no and ask the student who made the play to return the piece to the team board. The first team to place all of its game pieces correctly wins. For your information, correct placement of the 24 game pieces is shown below.

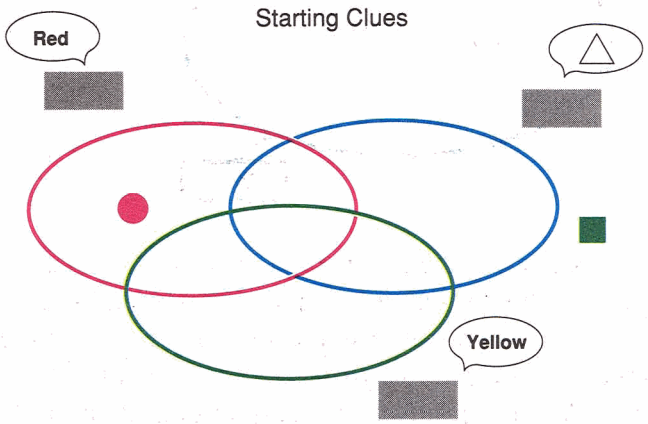


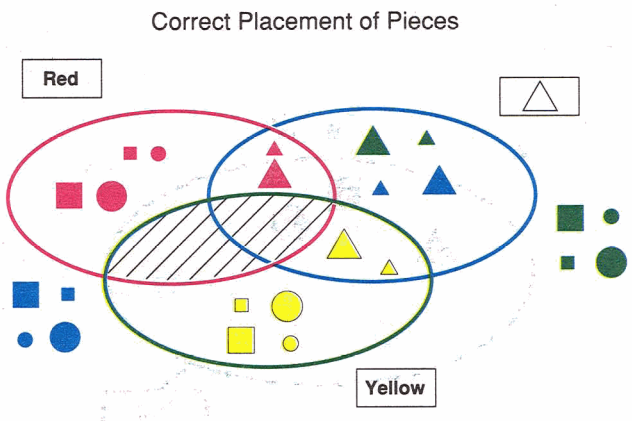
Note: This activity can just as easily be played cooperatively; that is, students can be given an opportunity to place game pieces of their choice in the picture. The class can help judge placement.

The A-Blocks String Game, Three-String Pictures

Play the String Game with three strings. Tell your class that there are sixteen possibilities[†] (point to the poster) for each string. Remember that for a team to win, they must be first to place correctly all of their share of game pieces and the player who placed the last piece must identify all three string labels.

The first of the next two illustrations suggests string labels (indicated in the bubbles) and appropriate starting clues for a game. The second illustration shows correct placement of the 24 game pieces.



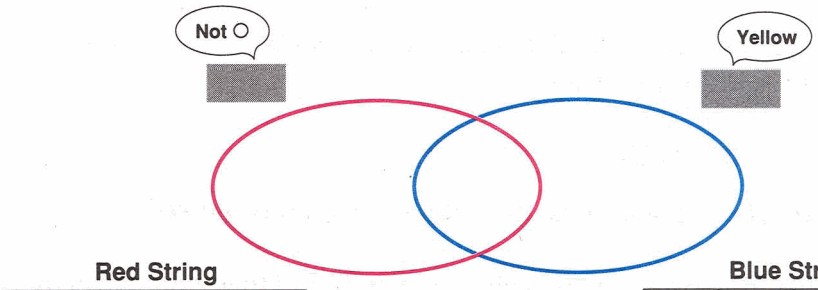


Note: There are no A-block pieces that are both red and yellow, so we "hatched" the intersection of the red and green strings.

[†]Although each string has sixteen possible labels, we suggest that you do not choose not-cards for any of the three-string labels until your students are quite familiar with three-string pictures. For three-string games, not-cards add a considerable level of difficulty, both for the teacher and for the student.

A-BLOCKS STRING GAME ACTIVITY 4 _____

Set up your board for the String Game as illustrated below. The bubbles show what is on the hidden tags. Tape two A-Blocks String Game posters (Version B) to the board, one for the red string and one for the blue string.



Red String

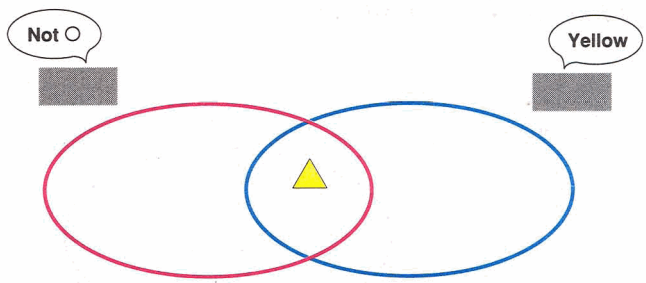
RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Blue String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

T: ***We are going to play the String Game today, but first we are going to look at what information we get from knowing where some of the game pieces belong in the picture. Finding out what the strings are for will be like solving a puzzle; each piece placed will be a clue.***

Clue 1



T: ***Your first clue is that the big yellow triangle belongs inside both strings. What information does this give about the strings? Are there any of these labels*** (point to one of the posters) ***that the strings cannot have?***

S: **RED,** ***because that piece is yellow and inside the strings.***

T: ***We can cross out* RED *in which list?***

S: ***In both.***

Use red and blue felt-tip markers or crayons to cross out **RED** in both lists.

In the same manner, let students continue analyzing the situation. Each time they say to cross out a label in one list because the corresponding string cannot have that label, they should notice that the same label should be crossed out in the other list. A piece in the center region gives the same information about both strings.

If a student suggests incorrectly that a particular label be crossed out in the lists, point out the error; for example,

S: *Cross out* **NOT RED.**

T: ***But this piece*** (point to the big yellow triangle) ***is not red.***

When your class has exhausted this clue, they will find that there are eight remaining possibilities for each string.

Red String

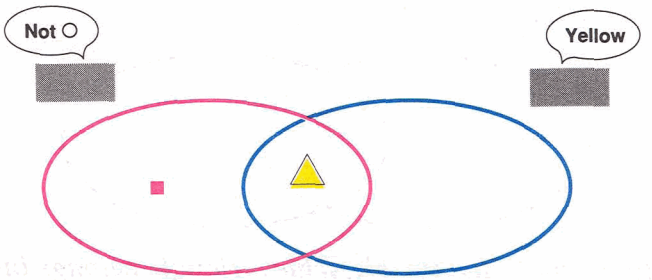
RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Blue String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Clue 2

T: ***I'll give you another clue. The little red square belongs in the red string but not in the blue string.***



Consider as a class the remaining labels in the red string list. Ask if there are any of those labels which the red string cannot have.

T (tracing the red string)***: Could the red string be for big?***

S: ***No, because there is a little piece in the red string.***

Cross out **BIG** in the red string list.

T (tracing the red string): ***Could the red string be for not circles?***

S: ***Yes, neither piece in the red string is a circle.***

Do not cross out **NOT** ○ in the red string list.

Continue the analysis until your class concludes that only three possibilities remain for the red string: **NOT GREEN; NOT BLUE;** and **NOT** ○.

Consider the eight remaining possibilities for the blue string. The analysis involved is slightly different for this string because the small red square is outside the blue string. Because of the position of this piece in the picture,

- whenever a label is eliminated as a possibility for the red string, it remains as a possibility for the blue string;
- whenever a label remains as a possibility for the red string, it is eliminated as a possibility for the blue string.

In the following dialogue, two of the eight remaining labels are discussed.

T (tracing the blue string): ***Could the blue string be for yellow?***

S: ***Yes, the little red square is outside the blue string.***

T (tracing the blue string): ***Could the blue string be for not circles?***

S: ***No, because the little red square is not a circle and it is outside the blue string.***

If no one responds, ask where the little red square would belong in the picture if the blue string were for **NOT** ○. Cross out **NOT** ○ on the blue string list.

After each of the eight remaining possibilities for the blue string have been discussed, your lists should look like these.

Red String

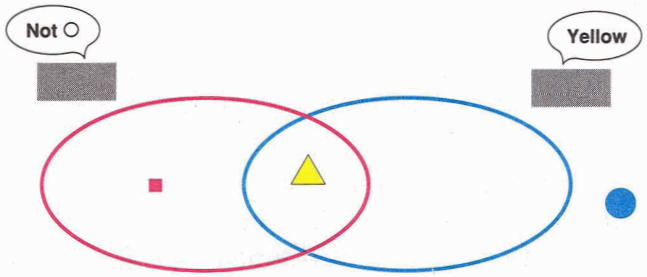
RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Blue String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Clue 3

T: ***Your next clue is that the big blue circle belongs outside both strings.***



As before, use the information to try to eliminate possibilities for the string labels. Since the big blue circle is outside both strings, the analysis for each string is the same as that used to consider the blue string after the second clue (little red square outside the blue string).

After considering the remaining labels (from the second clue) on the lists, you should have only two possibilities left for the red string and two possibilities left for the blue string.

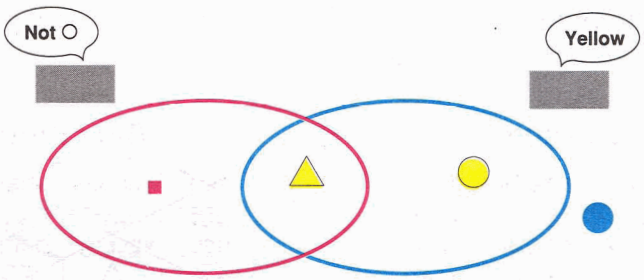
Red String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Blue String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Clue 4

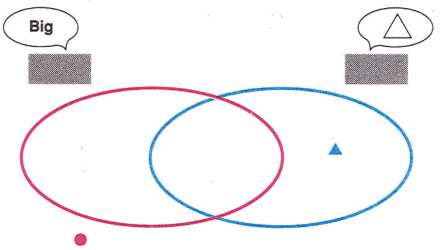


From this clue, your class should conclude

- that the red string label is **NOT** ○ (the large yellow circle is not blue, so **NOT BLUE** can be crossed out on the red string list); and
- that the blue string label is **YELLOW** (the large yellow circle is not a triangle, so △ can be crossed out on the blue string list).

Distribute analysis sheets† to the students. Play the String Game using not-cards (Version B). Before beginning to play, collectively analyze the starting situation as you did with any of the clues in Activity 3. Then continue the game in the usual way. As information is gained from plays, encourage the students to cross out on their analysis sheets labels that the strings cannot have. A suggestion for string labels and appropriate starting clues for a game are shown below. The possibilities that are eliminated by the starting clues are crossed out in the lists below the string picture. Correct placement of the 24 game pieces is shown in the second illustration.

Starting Clues



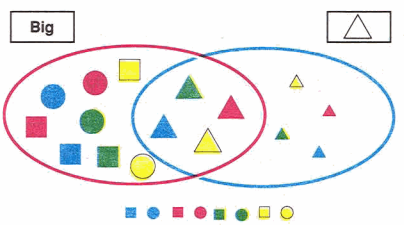
Red String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
			BIG
NOT	NOT	NOT	LITTLE

Blue String

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
			BIG
NOT	NOT	NOT	LITTLE

Correct Placement of Pieces



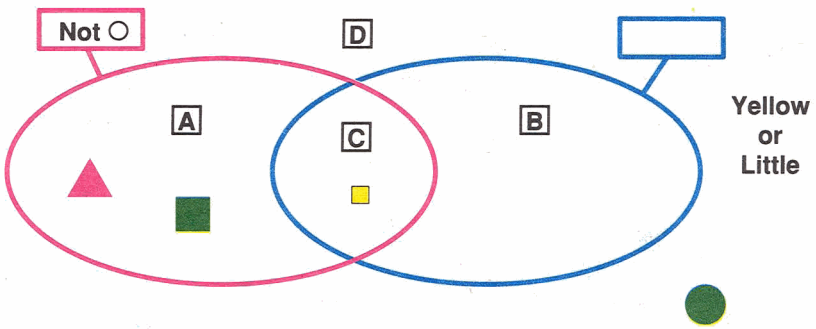
Note: The game might also be played cooperatively as a class in which the object is to determine the string labels with as few new game pieces placed in the picture as possible. The only difference between a cooperative game and the puzzle is that the students choose which pieces to try placing in the picture and their choices might not eliminate many possibilities of string labels. In this cooperative game, you may need to warn students about what information they get from a "no" answer.

†The next page has a sample analysis sheet that you may use to make copies for students.

A-Blocks String Game Analysis Sheet	
Red String	**Blue String**
RED	RED
YELLOW	YELLOW
GREEN	GREEN
BLUE	BLUE
○	○
△	△
□	▣
BIG	BIG
LITTLE	LITTLE
NOT RED	NOT RED
NOT YELLOW	NOT YELLOW
NOT GREEN	NOT GREEN
NOT BLUE	NOT BLUE
NOT ○	NOT ○
NOT △	NOT △
NOT ▣	NOT □

A-BLOCKS STRING GAME ACTIVITY 5

Put this string picture on the board.



T: ***Imagine that we are playing the String Game and that we now know the red string is for not circles but we don't yet know whether the blue string is for yellow or for little. I have labeled the four regions of the picture so that they will be easy to refer to.***

Away from the string picture display the A-blocks pictured below.

T: ***In which regions of the picture could each of these pieces belong? If there is only one possible location for a piece, we'll put it into the picture.***

S: ***The large red circle belongs in region D.***

T: ***Convince us.***

S: ***All pieces that are circles belong outside the red string. Since that piece is neither yellow nor little, it belongs outside the blue string, too.***

Put the large red circle in region D.

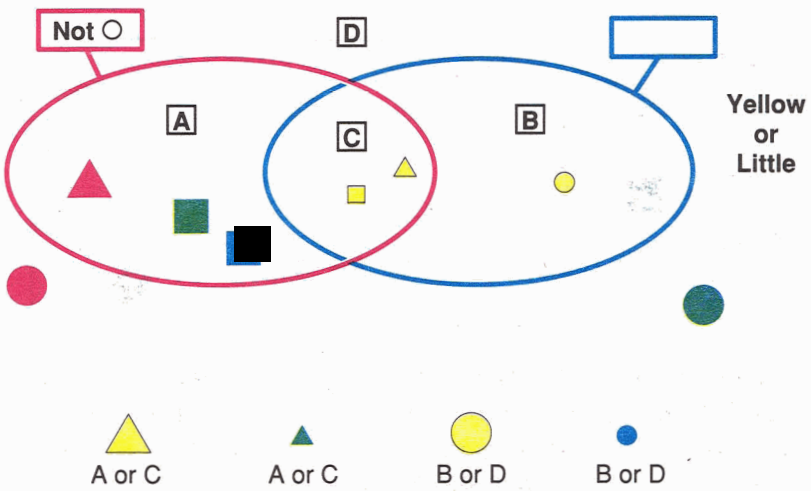
S: ***The large yellow triangle is not a circle, so it belongs in either region A or C of the red string.***

T: ***Do we know for sure which of those regions it belongs to?***

S: ***No. The large yellow triangle belongs in region C if the blue string is for yellow. It belongs in region A if the blue string is for little.***

Go over the two possibilities for the benefit of students who seem uncertain.

Record the possible locations next to the piece. Continue in this manner until your students find that there is sufficient information to locate four of the pieces and until they have discussed the possible locations of the other pieces.



T: ***Suppose it is your turn to make a play in the game and you select the little green triangle. Where would you play it?***

S: ***In region A.***

Note: Region C would also be a good answer. If a student says region B or D, point out that he or she is sure to get a "no" answer and ask another student to explain why this is so.

T: ***If I say yes, what do you know about the blue string?***

S: ***It must be for yellow.***

T: ***Why?***

S: ***Because if the blue string were for little the little green triangle would belong inside it.***

T: ***If I say no instead, what do you know about the blue string?***

S: ***It must be for little, because if the blue string were for yellow the little green triangle would belong outside it.***

We suggest you play the String Game with either two or three strings following this analysis activity.

A-BLOCKS STRING GAME APPENDIX

Equipment

PLAYING BOARD

The equipment for this game may be most easily managed if you have a magnetic (magnet sensitive) chalkboard available. Many permanently mounted chalkboards in classrooms are magnetic; you can test yours using a magnet. If your permanent chalkboards are not magnetic, try any portable chalkboard (dry erase board, and so on) that the school has available. If you do not have a magnetic chalkboard available, you can use your regular chalkboard.

TEAM BOARD

Team A	Team B

Note: The game may be played with three or four teams rather than two. In this case, create a team board with sections for more teams.

a) Magnetic: If you have a large magnetic classroom chalkboard, you can draw the team board directly on a portion of it. However, if you have a relatively small (portable) magnetic chalkboard, then you may need to obtain a sheet of metal (minimum size 60 cm by 80 cm) or locate a convenient metallic surface in the classroom such as the side of a file cabinet on which to put the team board. In this case, draw the team board on a large sheet of (chart) paper and tape this paper to your metallic surface.

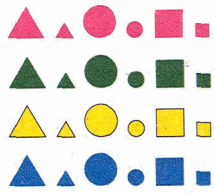
b) Non-magnetic: If you do not have a magnetic chalkboard available for the playing board, your team board can be a large piece of poster board (minimum size 60 cm by 80 cm).

GAME PIECES AND STRING CARDS

One set of game pieces and string cards are needed for each version of the game. A list of the string cards (A-Blocks String Game poster) should be posted above the team board—it is a constant reminder during the game of the possible labels for the strings.

A-Blocks String Game

Game Pieces



String Cards

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Game pieces, string cards, and the poster list of the string cards can be found in the A-Blocks String Game kit.

a) Magnetic: You can magnetize the game pieces (A-blocks) by sticking a small piece of magnetic material to the back of each one. (Magnetic material is included in the A-blocks String Game kit, or it is available in many stores in the hobby or notions departments.) Similarly, you can magnetize string cards by sticking a small piece of magnetic material to the front of each card, taking care not to obscure what is written on it.

b) Non-magnetic: Game pieces can be attached to the team board by using loops of masking tape stuck to the backs. A string card should have a loop of making tape stuck to the front so that what is written on the card is not obscured. With this type of equipment, be prepared to make necessary repairs by having sufficient masking tape on hand so that a loop of tape that loses its stickiness can be replaced on the spot. An alternative is to use a small wad of a plastic caulking compound (Rope Caulk or Mortite, for example) in place of the loop of masking tape.

Preparation for the Game

Draw two (or three, depending on which variation you are using) large, overlapping strings on the playing board using two (or three) different colors. Next to each of these strings attach one string card facedown. Locate the team board conveniently nearby. Randomly distribute the game pieces among the sections of the team board. Divide the class into teams using whatever method is acceptable to your class and assign each team a section of the team board.

Before any student takes a turn, correctly place an equal number (at least one) of each team's game pieces in the string picture. This eliminates the necessity of beginning the game on the basis of pure guesswork. You can influence how long the game will take by the number of pieces you place in the string picture before the game begins.

Object of the Game

Each team tries to place all of its game pieces correctly (according to the face-down string cards) in the string picture. The winning team is the one that first places all of its game pieces correctly and identifies the facedown cards correctly.

Rules of the Game

1) The teams alternate making plays, and the members take turns within each team. A player comes to the board and selects a piece from his or her team's collection to place in one of the regions of the string picture.

2) You are the judge. If the piece is correctly placed, say yes. The piece then remains in the string picture and the player immediately has a second (bonus) turn (no player may have more than two consecutive turns). If the piece is incorrectly placed, say no. The player returns the piece to the team's unplayed collection and play passes to the next team.

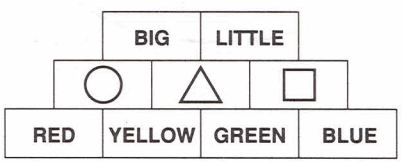
   As an aid in judging, prepare a crib sheet showing the correct position of each game piece or at least reminding you of what is on the facedown cards. If at any time you discover that you have made an error, say so immediately and rectify the mistake. Then either move an incorrectly placed piece to its correct region or replace a correctly placed piece that you had removed.

3) When a team has correctly placed all of its pieces, the player who placed the last piece may then attempt to identify the string cards. If he or she is correct, the team has won. If a mistake is made (even if it is only in the case of one of the string cards), simply indicate that the identification is incorrect and let the game continue.

4) If a team has exhausted its stock of game pieces and the strings have not been identified, that team continues to attempt to identify the strings on its turn, while the other team(s) works to place its game pieces.

The A-Blocks String Game (Version A)

This simplest version of the game uses 24 A-blocks as game pieces and only nine string cards.

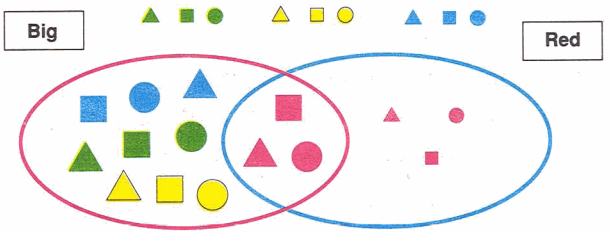


This list of string cards should be attached above the team board.

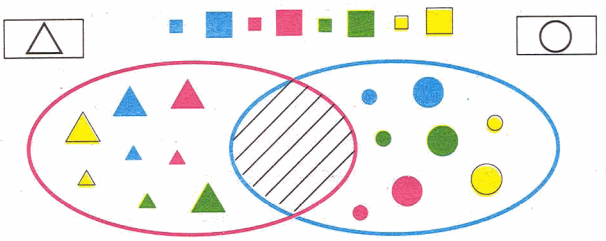
Below are several crib sheets for variations of the game with two and with three strings.

TWO STRINGS

Example 1: No empty regions



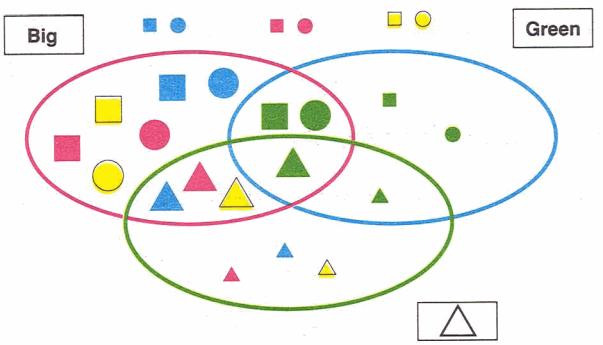
Example 2: One empty region



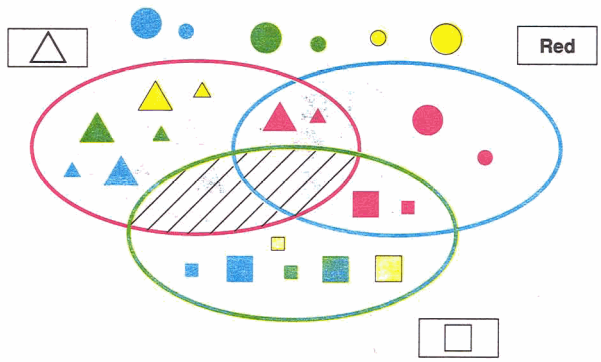
Note: We have indicated that the intersection of the strings is empty by "hatching" that region.

THREE STRINGS

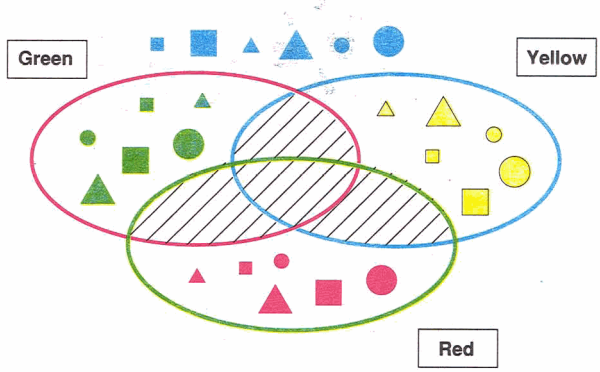
Example 1: No empty regions



Example 2: Two empty regions



Example 3: Four empty regions

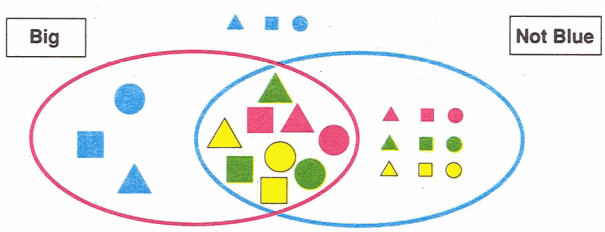


The A-Blocks String Game, Using Not-Cards (Version B)

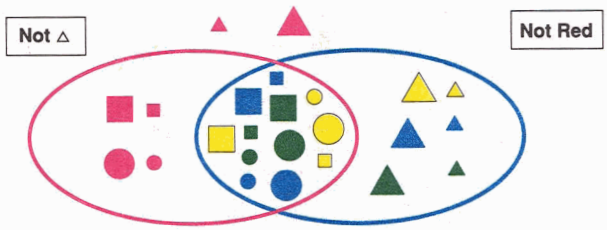
A more complicated version of the String Game with A-blocks uses all 16 of the string cards. A list of all 16 string cards should be posted above the team board.

Here are several crib sheets for this version of the game played with two strings.

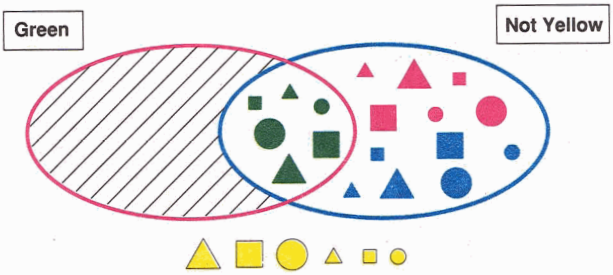
Example 1: No empty regions



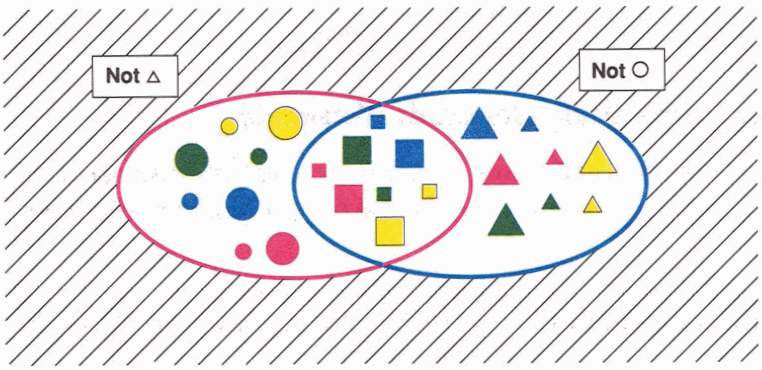
Example 2: No empty regions



Example 3: One empty region



Example 4: One empty region



Note: By hatching the "outside" region of the diagram we mean to indicate that no game pieces can be placed there correctly. Strictly speaking, that region is not empty because, for example, the number 50 is in the outside region.

You should be warned that the "not" version of the game played with three strings is very difficult to judge without a crib sheet and is equally difficult to play. Hence you would be well-advised to use it only when you think the two-string version is no longer challenging enough for the majority of your students.


McREL