

# ATTRIBUTE MATERIALS LAB

## Activity 1: Attribute Pieces

Use the 60-piece set of Attribute Pieces. Before beginning these activities, check your set to be sure all 60 pieces are available. If you don't have 60 pieces, it is easy to identify the duplicates, but how will you know which piece(s) might be missing? When you are convinced you have determined missing pieces, if any, let Dr. Mason know.

Why must there be 60 pieces in a set of Attribute Pieces with characteristics of large or small; red, yellow, or blue; rectangle, square, triangle, circle, or hexagon; and thick or thin?

Decide whether the following statements are true or false:

\_\_\_\_\_ Each of the 60 Attribute Pieces in your complete set is unique.

\_\_\_\_\_ It is possible to find a pair of Attribute Pieces that have neither size, color, shape, nor thickness in common.

## Activity 2: Play!

One partner is to create a design, pattern, or picture using the small attribute pieces; the other, using the large pieces. Convince your partner that your "creation" is more "mathematical".

What are the advantages of free play when you bring out new materials in your math class? What did you learn about the set of materials when creating your pattern?

Decide whether the following statements are true or false:

\_\_\_\_\_ Through free play children informally learn about the characteristics of the pieces by actually handling them.

\_\_\_\_\_ During free play with attribute pieces, children are formally using the vocabulary of color, size, and shape.

\_\_\_\_\_ The deliberate use of free play when the material is introduced encourages children to "get play out of their system".

## Activity 3: Missing Pieces

Spread the Attribute Pieces on the table. One partner removes a piece while the other partner looks away. Without touching any of the pieces on the table, identify the missing piece. When the missing piece has been identified, exchange roles and repeat this activity.

Variation: Again one Attribute Piece is removed after the pieces are spread on the table.

Organizing the pieces as you wish, determine the missing piece. When the missing piece has been identified, exchange roles, repeat the activity. Describe the strategies used to organize the pieces.

## Activity 4: Guess My Rule

Think of a "secret rule" to classify the set of Attribute Pieces into two piles. Use that rule to slowly sort the pieces as your partner observes. At any time, your partner can call "stop" and guess the rule. After the correct rule identification, players reverse roles. Each incorrect guess results in a one-point penalty. The loser is the first player to accumulate 7 points.

Variation: Sort the pieces into more than two piles. Which version is more difficult?

## Activity 5: One-Difference Trains

Trains have engines and cars. Place the thin, large, red circle on the table as the engine of the train. Cars are to be sequentially attached to the train according to the rule that the car to be attached must differ from the preceding car by a single attribute--by one difference. That is, the first car could be a fat, large, red circle or a thin, small, red circle, or a thin large yellow circle, or one of five other possibilities (Identify the possibilities.). Why could the fat, small, blue square not be the first car attached to the thin, large, red circle engine? Taking turns with your partner, build a train at least 20 cars long, verbalizing the difference as the next car is put into place.

- Could you have built a train using all of the Attribute Pieces? Try it!

Two-Difference Variation: Start with the same engine. This time attach a car that differs from the car to which it is attached by two-differences.

- Could you have built a train using the 30 large pieces before using any small pieces? Try it!

Three-Difference Variation: Agree on the Attribute Piece to be the engine. Build a train so that the adjacent cars will differ by exactly three differences.

Using Attribute Pieces in activities, such as Difference Trains, can mathematically challenge primary grade children to ... (That is, from a mathematics education point of view, what is accomplished if the children are participating in the activity?)

## Activity 6: Who Has the Button?

If you were working in a financially strapped school district, would a collection of buttons from home serve the same function as a set of Attribute Pieces? Why or why not? In which of the preceding activities could buttons be substituted for attribute pieces?

## Activity 7: Tibby

Use your students and their various attributes as attribute pieces. Select an attribute, such as the color of the student's shirt, but don't tell the students. Call a student's name and have him/her stand up and say, "You're a Tibby" if the student has on the color of the shirt you're thinking of; otherwise, say, "You're not a Tibby". Continue choosing students that are Tibbys and not Tibbys. Have students try to guess what makes a student a Tibby or not a Tibby.

Variations:

- Students take the lead and select a characteristic and determine who is/isn't a Tibby.
- Sometimes have Tibbys being the ones without a particular attribute, such as those students who do not have on red shirts.
- Involve two or more attributes in the determination of Tibbys.