# Algebra/Geometry Institute Summer 2008

**Faculty Name: Diane S. Owens**

**School: Carver Upper Elementary School**

**Title: Putting It Together**

**Grade Level: 3**

**Date: June 23, 2008**

1 Teaching objective(s)

- Analyze, predict, and model the number of different combinations of two or more objects and relate them to multiplication. (DOK 2)

2 Instructional Activities

a. The students will be informed that they will be learning how to find the maximum number of combinations made by groups of items without duplication. After forming as many possible combinations as they can (with given items) they will also demonstrate how their answers can be related to multiplication. The students will join me in the meeting area (carpet in front of chalkboard) where I will demonstrate forming combinations by taking three shirts (green, black, and yellow), three hats (purple, orange, and striped), and six students. I will have three students to put on the shirts, three different students put on the hats, and then pair a student wearing a green shirt with a different hat until we have all the possible combinations. Each colored shirt will be done the same way. We will record each combination as we make it and add to get the total possible combinations. I will then put Activity Sheet 1(previously prepared transparency) on the overhead and show what we just did and show them how they could have multiplied the number of shirts times the number of hats to get the same answer, therefore tying it in to multiplication. (Everything the students need for making the combinations will be on their tables.)

b. The students will work in groups (teams) for the activities. They will be paired in four groups. Each student will pull a number (1-4) from a cup/bag as he/she leaves the meeting area. Students will be seated at the table that corresponds with the number they pulled. Each group will work together on finding the combinations of their items, but they are all responsible for recording answers on their individual sheets.

c. Activity

1. The instructions will be placed on each table but I will read the directions and explain each step so that the teams understand what they are expected to do. The groups will only perform the activity at their table. Directions: You will work as a group to use the various pictures at your table to form as many different combinations as possible. Activities and materials for each group are listed in the materials section. As you form a combination, write it on your worksheet. After you have listed all the possible combinations, total them, then write the multiplication sentence that goes with your combination. All items (pictures will be pre-cut) needed to form their combinations and record them will be on the table.

2. Group one will be asked to find the maximum possible combinations for three desserts and four drinks. As they find the combinations they will write them on the worksheet given for that group. They will also be asked to total the combinations and write the multiplication sentence for their combinations.

3. In group two the students will be asked to find and record each combination for five sweaters and three pairs of shoes. They will also be asked to total the combinations and write the multiplication sentence for their combinations.

4. Group three will be asked to form, record, total, and give the multiplication sentence for their items. They will find the combinations for six flowers and three different vases.

5. Group four will be asked to form, record, total, and give the multiplication sentence for their items. They will form the combinations for four cars that can be painted four different colors.

3 Materials and Resources

a. Materials

**Introduction:**

Meeting area
Chalkboard / Dry erase board
Writing tools for board
Six students (for activity)
Shirts (1 green, 1 black, 1 yellow)
Hats (1 purple, 1 orange, 1 striped)
Activity 1 (transparency)
Overhead projector

**Group 1:**
Instructions
3 dessert pictures (cookie, pie, cupcake)
4 drink pictures (milk, water, juice, chocolate milk)
worksheet to record combinations

**Group 2:**
Instructions
5 sweaters (red, yellow, green, orange diamond, purple stripe)
3 pairs of shoes (red heels, red & black boots, blue tennis)
worksheet to record combinations

**Group 3:**
Instructions
6 flowers (red, yellow, purple, blue orange, white)
3 vases (green, red, blue)
worksheet to record combinations

**Group 4:**
Instructions
4 vehicles (car, jeep, van, convertible)
4 cans of paint (green, pink, brown, orange)
worksheet to record combinations

b. Resource(s):

Fuys, D.J., & Tischler, R.W. (1979). *Teaching Mathematics in the Elementary School*. Glenview, IL: Scott Foresman and Company.

Free Clipart Albums. http://www.cksinfo.com/index2.html June 25, 2008. (clipart)

Shorts and Shirts.http://illuminations.nctm.org/LessonDetail.aspx?ID=L180 . June 25, 2008. (quiz)

4 Assessment

a. Observation of students participating and working during the games. Converse with students about their strategies for finding their combinations.

b. Check and grade completed projects (worksheets).

c. Give students a short quiz to check for understanding of combinations and how they tie into multiplication. (After all groups have completed activity.)

5 Adaptation(s):

1. This exercise could also be performed by asking the students to show drawings of their combinations or giving students an increased number of groups of which they are to find the maximum number of combinations. Ex. 3 desserts, 4 drinks, and 3 vegetables.
2. Tree diagrams could also be used to display the possible combinations of groups of items.

Activity 1

## Combinations of Shirts and Hats

| Shirts | | Hats |
|---|---|---|
| 1 | green | orange |
| 2 | green | purple |
| 3 | green | striped |
| 4 | yellow | orange |
| 5 | yellow | purple |
| 6 | yellow | striped |
| 7 | black | orange |
| 8 | black | purple |
| 9 | black | striped |
| | | |
| 9 combinations | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Activity 1

| | 1-hat | 2-hats | 3-hats | |
|---|---|---|---|---|
| 1-shirt |  |  |  | 3 = combinations |
| | 1 | 2 | | |
| 2-shirts |  |  |  | 3 = combinations |
| | 1 | 2 | | |
| 3-shirts |  |  |  | 3 = combinations |
| | 1 | 2 | | |

There are three combinations for each of the three colored shirts, so this would be 3 + 3 + 3 = 9 combinations. To tie it in to multiplication you have 3 shirts x 3 hats = 9 combinations.

Group 1

**Directions:** You will work as a group to use the items at your table to form as many different combinations as possible. As you form a combination, write it on your worksheet. After you have listed all the possible combinations, total them, then write the multiplication sentence that goes with your combination.

Group 2

**Directions:** You will work as a group to use the items at your table to form as many different combinations as possible. As you form a combination, write it on your worksheet. After you have listed all the possible combinations, total them, then write the multiplication sentence that goes with your combination.

Group 3

**Directions:** You will work as a group to use the items at your table to form as many different combinations as possible. As you form a combination, write it on your worksheet. After you have listed all the possible combinations, total them, then write the multiplication sentence that goes with your combination.

Group 4

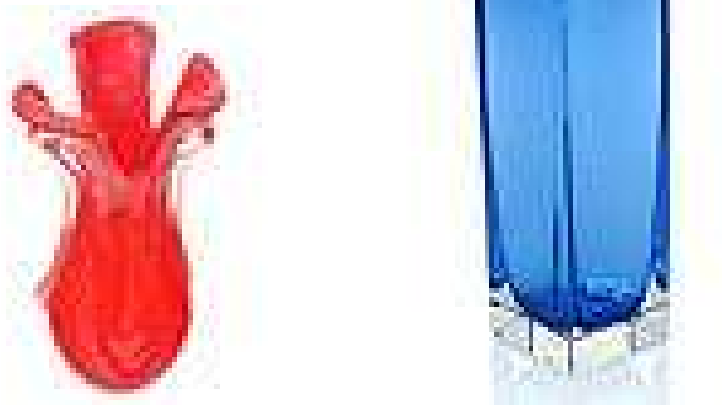
**Directions:** You will work as a group to use the items at your table to form as many different combinations as possible. As you form a combination, write it on your worksheet. After you have listed all the possible combinations, total them, then write the multiplication sentence that goes with your combination.

Pictures for Group 1



Pictures for Group 2

Pictures for Group 3



Pictures for Group 4

Group 1: Dessert and Drink Combination

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Total Combinations | |
| Multiplication Sentence | |

Group 2: Sweater and Shoes Combination

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Total Combinations | |
| Multiplication Sentence | |

Group 3: Flower and Vase Combination

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Total Combinations | |
| Multiplication Sentence | |

Group 4: Car and Paint Color Combination

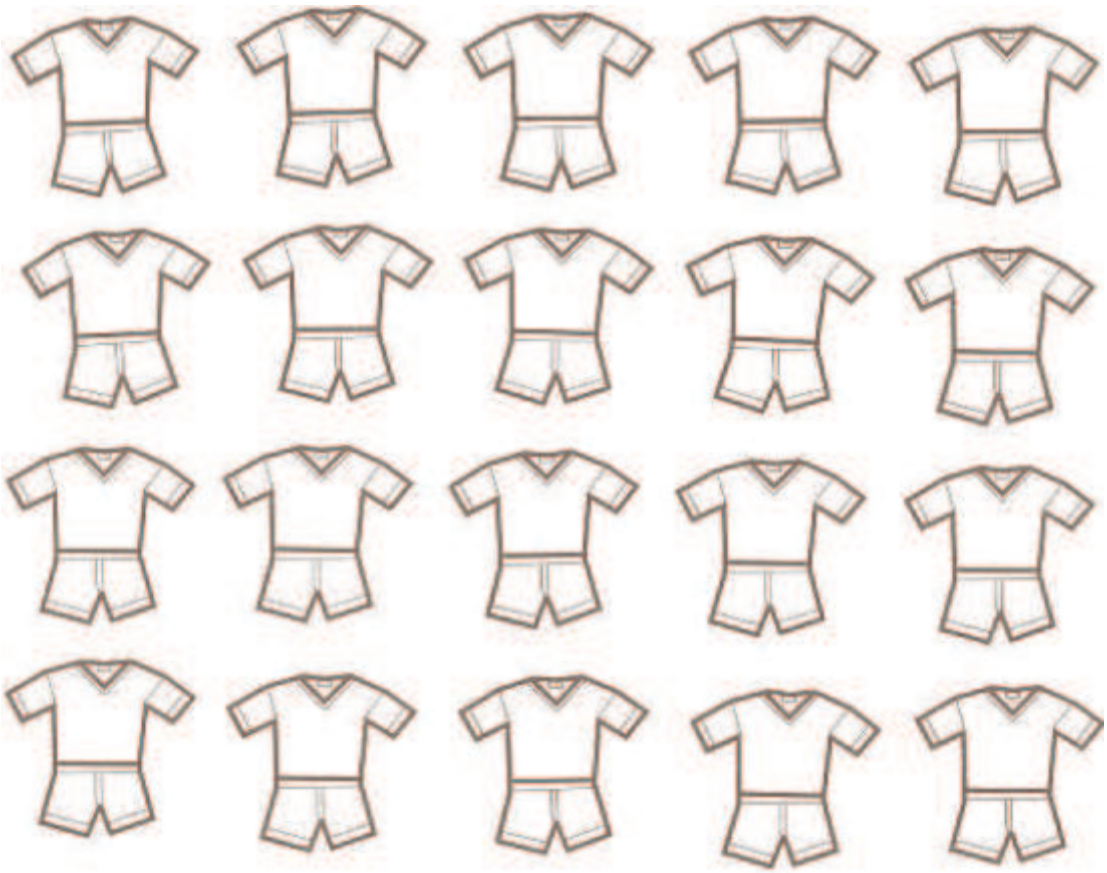
| | |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Total Combinations | |
| Multiplication Sentence | |

NAME _____ Date_____

# Quick Quiz

**Directions: See how many combinations you can form using the following information.**

Each shirt must be a solid color: yellow, orange, blue, or red. Each pair of shorts must be a solid color: brown, black, green, or purple. How many different outfits can be made? What is the multiplication sentence for your combinations? No two outfits should be the same.



1. What is the maximum number of combinations? _____ combinations
2. Write the multiplication sentence for those combinations.
   _____

# Quiz Key

Students should have the following 16 correct combinations:

The maximum number of combinations is___16___

The multiplication sentence is 4 x 4 = 16