## Math 3 - Act. 09: Multiples of Patterns

Summary
Students will use a multiplication chart to identify and share patterns.
Main Core Tie
Mathematics Grade 3
Strand: OPERATIONS AND ALGEBRAIC THINKING (3.OA) Standard 3.OA.9
Materials
Bag of Tootsie Rolls
Multiplication chart
Crayons, markers, or colored pencils
Calculator (for the "multiple race")
Additional Resources
The Best of Times by Greg Tang
Sea Squares by Joy Hulme
Spunky Monkeys on Parade by Stuart J. Murphy
Bats on Parade by Kathi Appelt
One Hundred Hungry Ants by Elinor J. Pinczes

## Background for Teachers

Third grade students should become familiar with basic multiplication combinations and should have many experiences in finding and describing patterns.

## Intended Learning Outcomes

1. Demonstrate a positive learning attitude towards mathematics.
2. Reason mathematically.
3. Communicate mathematically.
4. Make mathematical connections.
5. Represent mathematical situations.

## Instructional Procedures

Invitation to Learn
Have the class sit in a circle on the floor. Give every student five Tootsie Rolls to lay on the floor in front of them. This week, the class will practice the multiples of three by skip counting up to 27. (Twentyseven was selected because it is the ninth multiple of three. When other multiples are practiced, state the ending number before the students begin
to count.) Everyone will pat their knees, clap their hands, and snap their fingers. The person to start the skip-count by three's will begin on the snap of their fingers with " 0 ." The person sitting next to them will say " 3 " on the next snap of the fingers, and so on. Should a student state the wrong number instead of the multiple, then they will have to put a Tootsie Roll into the center of the circle. The cycle begins where it left off with the next child. The student that reaches " 27 " gets to take all the Tootsie Rolls from the middle of the circle. The play begins again. (Submitted by Jodi Rees taken from a workshop by Kim Christopherson \& Kris Thurgood.)
Instructional Procedures
Distribute the multiplication table without the index. Find the line of symmetry. This means that the square that has a 12 in it will lay on top of another square that has a 12 in it. Fold your paper
on this line of symmetry. What kinds of patterns do you notice? (A few more than half of the facts need to be memorized due to the Commutative
Property.) Where are the square numbers? (Notice the numbers along the fold that are even/odd. etc.)
Each student will need the smaller multiplication chart without the index. Do this activity at the time when the class is studying the model, patterns, and strategies of a particular set of multiplication facts. For the workshop sample, we will do a variety of facts for discussion purposes.
Each group will be assigned to color the multiples of designated facts.
In the students' journal, they will need to take a silent moment and write down any pattern they observe on their multiplication chart. At a designated time, the students will turn to a partner and share, adding their neighbor's observations to their own journals. A class chart will be created. At the end of the week, each student will glue their multiplication pattern on a chart to create a "Multiplication Quilt" (this idea was shared by Linda Flynn). Once several patterns have been glued on the quilt, the patterns can be compared and discussed. Sample questions have been included.

Are there any tables that have the same or similar patterns?
Is there a difference between the tables with multiples of even numbers and the tables that show multiples of odd numbers? Explain your thinking.
Should "0" around the outside edge be colored? Explain your thinking.
Looking at table 8, why is every other number shaded in the row four? Which number/numbers are shaded in row seven? Why? Which row/rows are completely shaded? Why?
(For the adult participants) Which of the multiplication patterns look alike and why? (2, 3, 5, 7, \&
11 are prime) If we continued, how would $13 \& 17$ appear? What would "1" look like and why?
Curriculum Integration
Math/Science-Use the calculator constant key to practice the multiples of a given number. Look at the patterns that are created. This can be done with partners or alone.

## Extensions

Possible Extensions/Adaptations
Houghton Mifflin 2001 Text Grade 3rd : Level 3.1 Celebrating Traditions Theme 2: Rewards
The Keeping Quilt by Patricia Polocco
Homework \& Family Connections
Send a multiplication chart home with the students. The student must convince their parents why only one half of the chart has to be memorized. The parent will need to write back to tell if the argument was convincing.

## Assessment Plan

List five patterns in your math journal that you see on your multiplication chart.
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