NCLB Summer Math Institute 2011

Faculty Name: Reginald D. Forte

School: EmBoyd Elementary School

Grade Level: 5th

1. Teaching objective(s)-

- **NCTM Standards** Data Analysis and Probability- (Students will)-
  - Predict the probability of outcomes of simple experiments and test the predictions.
  - Find the number of possible combinations of a set of items.

2. Instructional Activities-

Opening

- **Anticipatory set**- To get the students attention, the teacher will begin by presenting the following opening problem: Regina is using 3 different color beads to make a bracelet. If she places the beads on a string, how many ways can Regina arrange the beads?
  - Have students work in groups to use color tiles to find all possible combinations for placing 3-different color beads on a string. (Have groups share their strategy and solutions).
    - Essential Questions related to the opening activity?
      - Does the order of the choices matter?
      - What type of bracelet could Regina make in which the order of the choices does not matter?
  - The teacher will say, "Today we will find the number of **possible combinations** of a **set of items**." The teacher will reflect on the opening exercise and remind the students of the vocabulary associated with this lesson.
    - Set of item= The Color beads (Color Tiles)
    - Possible Combinations= The many ways we arranged the beads (the order didn't matter).
- **Input**- The students and teacher will discuss why this objective is important. The teacher will say, "Today's lesson gives us a chance to investigate the possible outcomes of a set of items and it helps us relate to similarities and differences among related sets."
- **Modeling**- The teacher will model on the overhead or power point to further explore the lesson's concept. The teacher will also model how to organize the sets of items using a tree diagram. The teacher will model the following problem:
  - What outfits combinations can I make using the following clothing items: red top, blue top, green pants, and blue pants?
  - *(The answer: red top, green pants; red top, blue pants; blue top, green pants; blue top, blue pants).*

- **Check for Understanding-** The teacher will remind the students that it is important to organize the set of items (e.g., using a tree diagram). Check for understanding by using the following problem:
    - Ways to arrange the letters in the word MAN (The answer: MAN, MNA, AMN, ANM, NAM, NMA).

Work Period / Guided Practice (Activity)

- *SPIN TWO COLOR SPINNERS*
    - In this activity, students learn that experimental probabilities differ according to the characteristics of the model; they also grapple with the idea of variability- that two identical spinners may not result in identical experimental data.
    - In this experiment the students will spin 2 spinners and record the results. Because the spinners look alike, the students need to call the spinner on the left "Spinner 1" and the spinner on the right "Spinner 2".
    - There are four possible outcomes on each spinner: red, yellow, green, and blue. When the spinners are turned together, the possible outcomes are red red (RR), red yellow (RY), red green (RG), red blue (RB), yellow red (YR) yellow yellow (YY), yellow green (YG), yellow blue (YB), green red (GR), green yellow (GY), green green (GG), green blue (GB), blue red (BR), blue yellow (BY), blue green (BG) and blue blue (BB).
    - The students will make a chart that lists all possible outcomes. Spin both spinners 80 times and record their results by making tally marks next to the outcome they get.
        - *Refer to **attachment 1and 2** for concise directions on this activity.*
    - When Students have finished the activity, have them to reflect on the essential question.
        - **Essential Question**- Students will answer the essential question: *How do different combinations change the outcome of a set of items?*
- **Closing**- Today we learned how to find the number of the possible combinations of a set of objects. How many combinations can be made from a 3 digit number if the digits are 1, 2, and 3?

3. Materials and Resources-

- Chalkboard/Whiteboard/ Elmore
- Color Tiles
- Transparency
- Overhead projector
- Worksheet (Attachment 1&2)
- Paper/Pencil
- Textbook: Harcourt Brace & Company; Mathematics Plus; Copyright 1994
- Workbook: Learning Resources; Data, Chance & Probability; Copyright 1993
- NCTM (National Council of Teachers of Mathematics); Navigating through Data Analysis and Probability in Grade 3-5; Copyright 2002.
- Spinners

4. Assessment-

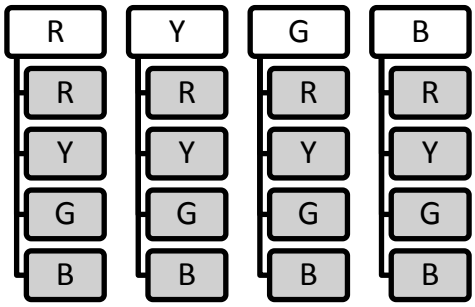
- The teacher will assess the students using their oral responses, observe the students as they complete their activities, and attachment two as an formative assessment.

SPIN TWO COLOR SPINNERS (SIDE 1)

Use two color spinners.

In this experiment you will spin both spinners and record results. Because the spinners look alike, you need to call the spinner on the left "Spinner 1' and the spinner on the right "Spinner 2".

The four possible outcomes on each spinner are red, yellow, green, and blue. When the spinners are turned together, the possible outcomes are red red (RR), red yellow (RY), red green (RG), red blue (RB), yellow red (YR) yellow yellow (YY), yellow green (YG), yellow blue (YB), green red (GR), green yellow (GY), green green (GG), green blue (GB), blue red (BR), blue yellow (BY), blue green (BG) and blue blue (BB).



Make a chart that lists all possible outcomes. Spin both spinners 80 times and record your results by making tally marks next to the outcome you get.

Example:

RR	𝍸	**GR**	|||
RY	𝍸	**GY**	𝍸 ||
RG	|||	**GG**	𝍸 |
RB	𝍸	**GB**	𝍸 |
YR	||||	**BR**	||
YY	𝍸 ||||	**BY**	𝍸 |
YG	|||	**BG**	𝍸 |
YB	𝍸	**BB**	||||

Count the total number of times you got each outcome. The probability of getting YG is 1/16. Why? In 80 trials you would expect to get 5 results for YG. Did You?

After you have completed this experiment, turn over and answer the questions on the next page.

SPIN TWO COLOR SPINNERS (SIDE 2)

1. **How many possible outcomes (combinations) are there?**
2. **Is the probability of red yellow equal to the probability of green blue?**
3. **P (YB)= _____**
4. **P (GG)=_____**
5. **P (one of the spinners is red) = _____**
6. **P (neither spinner is blue) = _____**
7. **P (Both spinners are the same color) = _____**
8. **P (Both spinners are different colors) = _____**
9. **P (RG or GR) = _____**
10. **P (the first spinner is not yellow) =_____**