MIX AND MATCH

Teaching Guidelines

Subject: Mathematics
Topics: Probability (the counting principle**)**
Grades: 5 – 7

Concepts:

- Probability
- Outcome

Knowledge and Skills:

- Can use the counting principle to find the number of possible combinations of elements
- Understands that many possible combinations can be created from small sets of elements

Materials:

- a "secret bag" with a variety of colored geometric shapes
- a suitcase

For each table:

- a penny, a single die and a 4- or 6-way spinner

For each student:

- a small sack or plastic bag with 3 "shirts" of different colors and 4 "pants" of different colors, cut from construction paper (put all of these bags in the suitcase)

Procedure:

1. Introduce the lesson by telling the class that today the lesson is going to be about probability. Ask students if they know what "probability" means and discuss until it is understood (*how likely it is that something will happen*).
2. Take out your "secret bag," and tell the class that you are going to have one of the students take something from it. Ask what is the probability that it will be yellow, accept some answers, and then have a student pick something. Repeat this a few times until it's very clear that one cannot predict what might come out of the bag unless you know what is in the bag.
3. Ask students if anyone knows the word that means "the result of an action or an experiment", and in this way get the word "outcome" defined and understood.

4. Ask the students to look at the penny, the die, and the spinner on their table and to write down all of the outcomes that could happen from flipping the penny, rolling the die, or spinning the spinner.

   Discuss the penny first. List the outcomes, and count them. Then discuss the probability that a flipped penny will land heads or tails. Make sure that students understand the difference between the concept of "outcome" and the concept of "probability". Ensure also that students see that in order to figure out the probability of a particular outcome with the penny you have to know how many outcomes there could be.

   Discuss the die and spinner in a similar fashion, until students clearly grasp the relationships between "outcomes" and "probability" for each.

5. Bring out your suitcase and tell the class that you were thinking about outcomes when you packed for your last trip. You didn't want to pack too many clothes, but you wanted to have lots of different outfits. Tell the class that you would like to have the students help you with that problem, so you have brought some of your clothes to class.
6. Take the bags of "clothes" out of the suitcase and distribute them to the students. Tell them you want them to determine how many different outfits could be made from the clothing they have.
7. Circulate and observe as students work on the problem. As you do so, ask them to explain to you what they are doing.
8. When students have completed the activity, ask some of them to explain their answers to the class. If one student discovers that the number of outcomes is the product of the number of shirts and the number of pants, have that student explain it. If not, ask students if they see any relationship between the number of shirts, number of pants and total number of outfits. In either case, once the relationship is clear, explain that this is called the "counting principle" (because it helps you quickly determine *how many* combinations you can make) and discuss several examples of it.

Patterns for "shirts" and "pants":