



CETL Capstone Project

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Context

My assignment is in the area of Mathematics Education. I teach MATH 201-Elements of Mathematics I and MATH 202-Elements of Mathematics II. This semester I adapt more group work activities in the Math 201 and 202. The book is fairly straight forward about presenting definitions and problems. I would like to incorporate a more active learning strategy in this area of the course.

Cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. Students work through the assignment until all group members successfully understand and complete it.

Cooperative efforts result in participants striving for mutual benefit so that all group members:

- gain from each other's efforts. (Your success benefits me and my success benefits you.)

- recognize that all group members share a common fate. (We all sink or swim together here.)
- know that one's performance is mutually caused by oneself and one's team members. (We can not do it without you.)
- feel proud and jointly celebrate when a group member is recognized for achievement. (We all congratulate you on your accomplishment!).

I introduced some activities and gave students to do these activities during seventh and eighth week in Math 202 class. These activities support students as they conceptually develop a sense of how probability affects the outcome of games. Students will find that applying their knowledge of probability will help them win some of the games. Also these activities are excellent for students who will be the elementary teachers in the future. It will help them to see how these activities work for their student learning.

After students have had several informal game-playing sessions, introduce the charting of the outcomes of throwing two dice. It is very helpful to give students two different colored dice as they ponder this problem so that they see that they can toss a 3 on the red die and a 4 on the blue die AND vice versa: a 4 on the red die and a 3 on the blue die. Both sum to 7 so they represent two DIFFERENT ways to toss a sum of seven.



- [Data Analysis: One-Die Toss Activities](#) for games that help students develop an understanding of the probability of the outcomes of tossing one die. Games include Pig, Car Race, Ladybug, Fly Home!, Free the Animals, and Release the Prisoners, The Cereal Toy Investigation encourages students to investigate the probability of collecting all six toys in a cereal sales promotion.
- [Data Analysis: Two-Dice Toss Activities](#) for games that help students develop an understanding of the probability of the different outcomes of tossing two dice. Students are asked to organize the data, analyze the results and use this working knowledge to

develop effective winning strategies for the different games. Games include two-dice versions of favorites: Pig, Free the Animals, Release the Prisoners, and Face Off! Several new games are also introduced: Skunk, M&M Probability Game, and the Great Cookie Contest.



Two-Dice Games

Game of Pig: 2-dice version: Students should be familiar with the one-die version of [Pig](#) before playing the 2-dice version. Tossing a one on either die means that the player loses all points collected in that round, if he/she has not stopped before the one is thrown. Any player who is still playing when snake-eyes (double ones) are thrown, loses all points collected thus far in the whole game!

- **Game Analysis:** Students need to develop different strategies for playing this 2-dice version of Pig. After playing several times, student pairs might analyze the two-dice frequency chart to calculate the probability of a one being tossed. Students can use this information to develop a winning strategy and compete against other teams to see whose strategy is most successful.

Notes: These probabilities activates were taking from Mthawire.com

[This is handouts of one of activities we did in the class time:](#)

Two-Dice Sums (Grades 1-8)

Math concepts:

Students of all ages can play this game, as long as they're able to add the numbers that come up on two dice. While younger children benefit from the practice of adding, older students have the opportunity to think about the probability of the sums from rolling two dice.

The object: to remove all the counters in the fewest rolls possible.

How to play:

Two or more players can play. Each player needs 11 counters, a game strip that lists the numbers from 2 to 12 spaced far enough apart so the counters can fit on top of each number, and a recording sheet. Here are the rules for playing:

1. Each player arranges 11 counters on the game strip and records the arrangement.
2. Once the counters are arranged, players take turns rolling the dice.
3. For each roll, all players can remove one counter if it is on the sum rolled. Players keep track of the number of rolls of the dice it takes to clear their game board.

After students have had the chance to play the game for couples time, have a class discussion about the different ways they arranged the counters and the number of rolls it took. *Have them write about the arrangements that are best for removing the counters in the fewest number of rolls. For an extension, try which Number Wins?*

		Number on Second Die					
		1	2	3	4	5	6
Number on First Die	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12
		Possible Sums					

Why I use Cooperative Learning? Research has shown that cooperative learning techniques:

- promote student learning and academic achievement
- increase student retention
- enhance student satisfaction with their learning experience
- help students develop skills in oral communication
- develop students' social skills
- promote student self-esteem
- help to promote positive race relations

My job were randomly examining students orally by calling on one student to present his or her group's work to the teacher (in the presence of the group) or to the entire class. Observing each group and recording the frequency with which each member-contributes to the group's work. I also assigned one student in each group the role of checker. The checker asks other group members to explain the reasoning and rationale underlying group answers. From my class, I found students shown orally explaining how to solve problems, teaching one's knowledge to other and discussing concepts being learned.

End of each activities, I requested students discuss how well they are achieving their goals and maintaining effective working relationships and make decisions about what behaviors to continue or change. Students enjoy these activities we did during the class time.

I also gave my students a writing assignment to ask them to reflect on why probability theory is useful for our life. My purpose is that let them to think about how we could relate math idea in our real life. Let them explore it and feel how powerful it is. I was happy, when I graded their papers. They really caught what I expect them to write and spend some time to think about this problem. Most all of the students mentioned gambling, some students pointed out most important reason is for medical reasons. The probability is used in medicine is for ratios. In other field, adverting agent are always trying to figure out how many people are going to be attracted to their Ad They do test on different groups of people to find the probability of how many people are going to be interested in their product; how catchy The ad is, who is directed toward, and how much money they are going to make off of the

product and ad I would like to give students more writing assignment to open their mind in the future.

Reference

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