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Probability Using TI Calculators

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Lesson Plan using **TI Technologies**

Name: Beverly Lawson
Grade level(s): Special Education 7th- 9th / Math Population: Learning Disabled and Educational Mentally Retarded
Objectives: **Probability** Upon completion of this lesson, students will: • Will understand and apply basic concepts of probability • Will understand and use appropriate terminology to describe events • Will use probability to make and test conjectures about the results of experiments and simulations

Lesson Description:

Probability: The discussions that make up this lesson introduce ideas that are the basis of probability theory and by using everyday experiences and intuitive understanding, this lesson gives students a gradual introduction to concepts of probability such as ***Theoretical Probability:*** is when your using a formula to determine the probability of an outcome, This type of probability is demonstrated by dice rolls, coins tossed, where the outcomes are equally likely to occur. ***Expressing Probability:*** is usually expressed as a fraction, a decimal, or a percent; such as there is 1 chance in 4. It can be expressed as ¼, 0.25, or 25%. ***Experimental Probability:*** is when you can determine the probability or an event by doing an experiment. Using the TI-84 graphing calculator and the Probability Simulation to demonstrate and have students work with guided practice on each of these concepts.

Procedure:

I was thinking about beginning the class on modeling an example of probability using bag containing two chips, one red and the other black, leading to the question of who knows which chip I will showing the students each chip and placing it back into the bag, I would ask what chip will be pulled first. Leading to what is this type of demonstration called looking for what background knowledge or terms known. I would ask them to think about and be prepared to give examples of other things that could be used in a probability experiments. After about five minutes, I would have the students give their ideas and write them down on a transparency or chart paper. From here, I would provide a 10 to 15 minute demonstration of the basics of using the TI-84 over head projector.

10 minutes

1. How will you begin the lesson?

In this lesson, I would also explain spreadsheets and how graphs might be used in a probability experiment. I would have a mini demonstration on how to capture/collect information. Also, to show students how the probability system works on the calculator.

15 minutes

This lesson introduces the following terms through discussions:

- ✓ experimental probability
- ✓ expressing probability
- ✓ theoretical probability

Mini demonstration:

One way to model it would be to use the TI-84 and over head projector to model rolling a single dice through the application program. Point out on large copy of face of calculator the correct keys to model program. Have students push the pink ***APPS*** key. Using down arrow scroll down until ***:Prob Sim;*** press enter to ***Probability Simulation***; within this program you can see: **Toss Coins; Roll Dice; Pick Marbles; Spin Spinner; Draw Cards; and Random Numbers.**

(Table below) This illustrates the difference between an outcome and an event. A single outcome of this experiment is rolling a 1, or a 2, or a 3, or a 4, or a 5, or a 6. Rolling an even number (2, 4 or 6) is an event, and rolling an odd number (1, 3 or 5) is also an event. *(Create this table on an overhead or chart paper for visual learners)*

$$P(1) = \frac{\text{number of ways to roll a 1}}{\text{total number of sides}} = \frac{1}{6}$$

$$P(2) = \frac{\text{number of ways to roll a 2}}{\text{total number of sides}} = \frac{1}{6}$$

$$P(3) = \frac{\text{number of ways to roll a 3}}{\text{total number of sides}} = \frac{1}{6}$$

$$P(4) = \frac{\text{number of ways to roll a 4}}{\text{total number of sides}} = \frac{1}{6}$$

$$P(5) = \frac{\text{number of ways to roll a 5}}{\text{total number of sides}} = \frac{1}{6}$$

$$P(6) = \frac{\text{number of ways to roll a 6}}{\text{total number of sides}} = \frac{1}{6}$$

$$P(\text{even}) = \frac{\text{\# ways to roll an even number}}{\text{total number of sides}} = \frac{3}{6} = \frac{1}{2}$$

$$P(\text{odd}) = \frac{\text{\# ways to roll an odd number}}{\text{total number of sides}} = \frac{3}{6} = \frac{1}{2}$$

2. What are the teacher and students doing every 5-10 minutes? (Teacher Actions and Student Action through Guided Practice)

I would then begin the student's task by pairing up the students to have them run the experiment of rolling a single dice in the TI- 84 application. Then I would pair students together having one be the recorder and the other conducts the probability experiment. Student rolls dice (50 times using the worksheet provided as the guide); the other student records the data. I would have each student roll the dice and (1) creates probability outcomes, (2) record data and (3) create a spreadsheet using the probability data and then a (4) graph for visual reference.
15 to 30 minutes

3. How will you assess the learning for the lesson?

Walking around and asking questions I would see student's results and using the calculator program shows their results in a digital format. The students will complete a worksheet independently. (Below)

A Roll of the Die

Find the probability of rolling the given number(s) using a stand die.
Remember.

$$P(\mathbf{n}) = \frac{\text{number of } \mathbf{n} \text{ outcomes}}{\text{number of possible outcomes}}$$

Example: P(number < 3) = 2/6 or 1/3.

1. **P(1) =** _____
2. **P(even number) =** _____
3. **P(number < 5) =** _____
4. **P(number ≥ 2) =** _____
5. **P(number > 3) =** _____
6. **P(number > 1) =** _____
7. **P(odd number) =** _____
8. **P(number ≥ 5) =** _____
9. **P(number < 2) =** _____
10. **P(number ≤ 3) =** _____
11. **P(2 or 3) =** _____
12. **P(even or odd) =** _____
13. **P(7) =** _____
14. **P(number 1 through 6) =** _____
15. **P(0) =** _____

Bonus: How are the answers for problems 6 through 10 related to the answers for problems 1 through 5? _____

15 minutes

4. Closure

- ✓ You may wish to bring the class back together for a discussion of the findings. Once the students have been allowed to share what they found, summarize the results of the lesson.

Suggested Follow-Up

- ✓ To learn about random number generators with probability on TI-84 graphing calculator.
- ✓ To use the computers and/or internet to learn about random number generators and probability.

Rubric

Name: _____ Teacher: Ms. Lawson

Date Submitted: _____ Title of Work: _____

	Criteria				Points
	4	**3**	**2**	**1**	
Explanation	A complete response with a detailed explanation.	Good solid response with clear explanation.	Explanation is unclear.	Misses key points.	__/4__
Use Of Visuals	Clear diagram or sketch with some detail.	Clear diagram or sketch.	Inappropriate or unclear diagram.	No diagram or sketch.	__/4__
Mechanics	No math errors.	No major math errors or serious flaws in reasoning.	May be some serious math errors or flaws in reasoning.	Major math errors or serious flaws in reasoning.	__/4__
Demonstrated Knowledge	Shows complete understanding of the questions, mathematical ideas, and processes.	Shows substantial understanding of the problem, ideas, and processes.	Response shows some understanding of the problem.	Response shows a complete lack of understanding for the problem.	_/4___
Requirements	Goes beyond the requirements of the problem.	Meets the requirements of the problem.	Hardly meets the requirements of the problem.	Does not meet the requirements of the problem.	__/4__
Counter Examples	*Defines* exactly how the modeling software "helped" solve the problem.	Includes counter examples	Counter example unclear	Does not include counter examples	__/4__
				Total---->	__/24__

Teacher Comments:

Another Rubric

Target	Acceptable	Unacceptable
Math Concept thoroughly addressed. Described (written) in rich detail.		
Graphs are neat, accurate and based on data from the model.		
Student is very capable of describing the model to a small group of peers and is able to respond meaningfully to questions about the model.		
Defines exactly how the modeling software "helped" solve the problem		
Student will complete independent worksheet on probability without help.		