

Dice rolling and Probability

by – Heidi Rudolph

Activity overview

The student will produce a large set of randomly generated integers between 1 and 6, simulating the roll of one fair die. (or a spinner with 6 equal sections) The relative frequencies can be discussed. After rolling two dice, the total is computed, and the sums are plotted. Discussion may take place regarding the relative frequencies and theoretical probability. The “shape” of the distribution is important.

Concepts

Relative frequency, random numbers, theoretical probability, dot plot.

Teacher preparation

Discussion of the concepts should precede this activity. Students may have difficulty explaining why one outcome appears more frequently in the experiment than expected. (expected value) Having students create the Sample Space or at least looking at the Sample Space from another source would be a good way to conceptualize what the outcomes may be.

Classroom management tips

Be certain to have all students use the Rand Seed command, preferably using something like the birthdate, which will “set” all calculators to seem more random than the factory settings.

Rand Seed (905) for a September 5 birthday will work.

TI-Nspire Applications

Lists & Spreadsheet, Data & Statistics (Notes are inserted as the instructions for the student).

Step-by-step directions

Send the document to students using the TI-nspire Navigator or Connect to Class software.

Each student performs the Random Seed operation in order that all calculators do not produce the same randomly generated numbers for the data.

In the Lists & Spreadsheet page, students command the **die1** to roll 100 random integers between 1 and 6, simulating the first die.

Repeat in the second column for **die2**.

In the third column, titled **total**, students will command the sum **die1 + die2**. (use the var key, or type in the variables) These totals are what will be plotted to look at the shape of the distribution.

On the Data & Statistics page, click on the bottom axis. Select the variable **total**. The dots will stack up as the correct frequencies for each value in **total**. Look at the shape of the distribution.

Press Menu, Analyze, Plot Value. Type **mean(total)** and see what appears. (as an alternative to the Dot Plot, you could select Histogram from the Plot Types menu)

Answer the questions that follow. The teacher will collect this file through Navigator or Connect to Class for discussion and analysis.

Assessment and evaluation

Formative assessment takes place during the activity, as students may be asked to explain or describe their results. Expect the correct vocabulary to be used in discussion. The questions at the end of the .tns document can be used for either formative or summative assessment. Teacher chooses Exam mode or Self check mode before sending the file.

Activity extensions

- *Various simulations using “randint” and different probabilities such as basketball free throws or baseball hitting (batting averages).*
 - *Play Yahtzee or other games involving dice rolling or spinners.*
 - *Activities involving “non-standard” dice such as tetrahedral dice or dice that are labeled with different numbers other than the numbers from 1 to 6.*
 - *Utilize a random number list from the back of a textbook. (the old fashioned way)*
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Student TI-Nspire Document

Dice_rolling.tns