



## Lesson Plans

**Recommended Grade Levels:** 3rd - 5th

**Recommended Subjects:** Math

**Applicable Concepts, Skills, and Strategies:**

- Probability
- Graphing
- Computation
- Fractions/percentages/decimals
- Risk taking

**Objectives:**

- To understand the concept of probability
- To work cooperatively
- To understand the concept of chance vs. strategy

**Components:**

- Classroom lessons to prepare students for playing
- Toss Up! game
- Independent Activities

**Materials Needed:**

- Toss Up! game(s)
- Overhead master for Activity #2



## Activity #1

This lesson involves the processes of observation and analysis.

- Have students work individually or in small groups.
- Each individual or group will need one of the Toss Up! dice.
- Instruct the students to look carefully at their die and write down what they observe.
- Then ask the students to write down their predictions about what most likely will happen when a die is tossed. Allow about 5 minutes for this combined task.
- Next, hold a group discussion to share the observations and predictions. Through this discussion, the students will note that each die has 3 green sides, 2 yellow sides, and 1 red side. Green most likely will be the color seen when a die is tossed.
- Introduce the term probability as you talk about what most likely or least likely will happen when the die is tossed.
- Ask the students to think about how they could show the probability of the different colors on the die being tossed. This discussion should lead to the use of different graphing types: pie, bar, pictorial, line.
- After the whole group discussion, ask the students or groups to design a graph to show the probability of each color on the die being tossed. Share the graphs.



## Activity #2

This activity will involve checking the probability of a color being tossed using a Toss Up! die.

- It is recommended that this be done in groups of 3, but it can also be done individually or in pairs. When done in groups of 3, assign each member a role: shaker, counter, or recorder. Roles can shift after every 10 shakes of the die or so. Role descriptions are as follows:
  - Shaker - Shakes the die.
  - Counter - Keeps track of the total number of shakes.
  - Recorder - Tallies each color as it is rolled.
- Have each group shake its die 100 times and record the results.
- Have each group use tally marks to record the number of die shakes and the number of times each color is tossed.
- Have each group record their final results on an overhead transparency similar to the chart provided.
- When all groups have recorded their results, discuss the comparison to the probability graphs completed in Activity #1.
- Discuss and model ways to write these results as percentages, fractions, or in decimal form.
- Using the totals from each group, have the students add up the numbers in each column.
- They can then divide by the number of groups to find the averages. Compare these averages with the probability graphs.
- Discuss the effect of having greater numbers to compare. Does this lead to a more accurate relationship between the results and the known probability of shaking one of the colors?
- Take time to talk about how this knowledge might be applied in other situations.



## Chart for Activity #2

Record your group's results below:

Group Members	Number of Tosses	Green Tosses	Yellow Tosses	Red Tosses



## Activity #3

Now it's time to teach the game Toss Up! This is the application component of these lessons.

- Each group of students will use the set of 10 dice. Groups of 2 to 6 work best for playing this game.
- Create your own scoring sheet or model the process for your students.
- Explain the rules of the game as given on the game's rule sheet. You might model playing the game with a group of students.
- Advise students to keep in mind what they have learned about probability. While playing the game, they should think about the strategies they are using and how chance plays a part in what happens.
- You can hold a class discussion about chance and strategy before and after the games are played. Is this a game of skill, chance, or both? How does this information affect how you might play the game?

This game is great to use as a math time activity or as an indoor recess activity on those rainy or cold days.

## At-Home Activity

Students could take turns taking a set of Toss Up! dice home.

- Encourage them to play a few games with their families.
- Have the students make a list of the games they like to play at home with their families.
- Encourage the students to think about how strategy and chance play a part in the games they play.
- You might also ask the students to bring in a favorite game and have a game day at school.