



# Dice Games---Fun with Math!

- Supplies:**
- 5 Dice
  - A cup or clear plastic container with a lid



**Age or Grade:** 8 and up!

**Time:** 30 Minutes

**Background:** Math doesn't need to be boring. Games like Yacht or the trademarked game Yahtzee\* are only a few of the games that can reinforce skills in multiplication, addition, subtraction, fractions, etc. and can make for a fun family game night! This game combines strategy and critical thinking as well chance and basic math skills. It isn't as easy as it looks and you need to strategize in order to get the highest score.

**Project Goal:** Reinforce math skills and have fun as a family.

- What to Do:**
1. Gather your family—this game is best played with 3-5 players.
  2. Read over the attached rules, then pass out a score sheet to each person.
  3. Take turns rolling the dice. The youngest family member goes first.
  4. Roll the dice. Set aside any dice that you wish to keep during your turn. Roll two more times, trying to get the highest score for each line on the score sheet. You must enter a score on one line for each turn—even if your score is zero.
  5. At the end of the game, add up the scores and the person with the highest total score wins!

- Reflect:**
1. What is the chance you would get 5 out of 5 of one number?
  2. What is the chance you would get a small or large strait?
  3. What strategy did you come up with before the game?
  4. Did your strategy change after the game?

- Apply:**
1. What are other games you play that involve strategy?
  2. Where else do you think about the odds?
  3. Why is it important to strategize when you are thinking about real world problems?

**Going Further** Yacht is the public domain version of the popular game sold under the name of Yahtzee. There are also a variety of other similar dice games such as **Générale** and **Cameroon**.

<http://www.dice-play.com/GamesAZ.htm>

Here are some resources for other math games using dice:

<https://www.newarkschools.us/Downloads/Math%20Games%20with%20a%20Pair%20o%20Dice.pdf>

<https://zenomath.org/toolbox/dice-games/>

<https://the-teacher-next-door.com/my-blog/math/math-games-using-dice>



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## Virginia 4-H STEM @ Home Activity

### Notes for Parents or Helpers:

For younger children, you may need to help them the first few times to reason out which dice to keep, which ones to throw and what to do when you don't get the score that you want. This game also teaches sportsmanship and resilience—don't be surprised if a family member is frustrated by a run of bad luck. With older children, it is a good opportunity to talk about dangers and allure of gambling.

**The Odds:** The probability of five of a kind in Yacht in one roll is 0.08 percent, the probability of a Yacht in two rolls is 1.23 percent and the probability of a Yahtzee in three rolls is 3.43 percent. Since each of these are mutually exclusive, we add the probabilities together. This means that the probability of obtaining a Yahtzee in a given turn is approximately 4.74 percent. To put this into perspective, since 1/21 is approximately 4.74 percent, by chance alone a player should expect a Yacht once every 21 turns. In practice, it may take longer as an initial pair may be discarded to roll for something else, such as a straight.)

<https://www.thoughtco.com/probability-of-rolling-a-yahtzee-3126593>



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