Natural Math

# Skewed RNGs for Fair Games

**PATHWAYS**
**#60 Probability Theory & Stochastic Processes**
**#62 Statistics**
**Sciences Applications**

*Photo of Chekutnak (stick dice) game from Plains Cree by Aboriginal Perspectives site*

## Family Math Circle ~~~ February 2024

**Pathways name our math inspirations using Mathematics Subject Classification. Mathematicians around the world label their work with library codes from MSC, https://msc2020.org/ Let us help students feel happy familiarity with each subject area!**

**Family Math Circle is an informal learning space where participants make advanced mathematics accessible to everyone in kind ways.**

## What Will Everyone Make?

**Roots and wings: Make models. Make connections.**

Make and find random number generators to compare random vs. deterministic events. Explore distributions of random numbers in probability and statistics. Make and play fair and unfair games that use RNGs.

## Words With Math Friends

**Tell friends and family all about your math creations. Use these terms +"math" to find images, videos, and articles on the web.**

- Random and deterministic events
- Random number generator (RNG)
- Probability, distribution
- Frequency, frequent events, rare events
- Skewed distribution, fair game, unfair game

*Add your family's own words to the Research Journal. Use these personal terms along with the standard terms.*

## Interesting Choices

**Mathematicians do many different things. What kind of math person will you be today?**

For your RNGs, choose values and their frequencies. Are you making your RNG to have a particular distribution, or making some RNG first and then investigating what distribution it has? Choose to design fair or unfair games to notice different properties of randomness.

*These are starter choices. You will come up with more ideas. Add them to the Research Journal.*

## Toolbox

Physical (gray=optional): Paper, colored pencils, scissors, tape or glue, counters, chips, beans, coins, dice, playing cards, found treasures.

Virtual:
Lava Lamps RNGs https://youtu.be/1cUUfMeOijg
Wheel of Names https://pickerwheel.com
Fold a Die https://youtu.be/ysAMKhdbn2o

https://naturalmath.com/circles/

Extra activities, videos, math connections, books, and other resources for math circle leaders.

*Photo: random raffle*

Math Circle Design by Dmitri Droujkov, Maria Droujkova and math friends | Creative Commons BY-NC-SA license by Natural Math

IS WHAT YOU MAKE IT!

▸▸▸ Name _ _ _ _ _ _ _ _ _ _ _ _ _ _ ◂◂◂

Words ~ Examples ~ Questions ~ Problems ~ Stories ~ Conjectures ~ Models ~ Art ~ Formulas ~ Graphs ~

▸▸▸ Research Journal ◂◂◂