



## Theme

By using the dice game, teachers can create a fun and engaging way to introduce fractions and graphing.

## Grade Level

3-5 grade

## Time/Location

2 Class periods  
1 class period to create their dice game.  
1 class period to play and collect data to graph.

## Goals

- Create simple graphical representations of the outcomes of a game of dice.
- Introduce students to the concepts of fractions.
- Give students practice with multiplication.

## Objectives

- Create a graph to show how many of their turns resulted in scoring 1, 3, 5, or 15 points.
- Represent their results as basic fractions and percentages.
- Demonstrate multiplication skills.

## Wabanaki Dice Game

### Background:

The four Wabanaki tribes have variations of a game of chance often referred to in English as the dice game. In the four native languages it is called: *waltestakonok* or *altestakonok* in Passamaquoddy and Maliseet, *waltestagn* in Mi'kmaq, and *walatehámakan* in Penobscot. This game appears rather complex at first, but once the players have become adept at scoring, the game moves rather quickly.

In the past, games of chance were used as forms of entertainment, as a way to settle hunting and fishing territorial disputes, and to redistribute possessions. During the course of this game individuals and possibly even whole villages wagered many of their possessions on the skills of the two individuals actually playing the game. Possessions were more than likely won back in subsequent games. Even though the game is rather simple, it can take days or even weeks for a winner to be declared because of the complex scoring system. Modern *waltestagn* tournaments continue in many Mi'kmaq communities in Canada and the Penobscot Nation in Maine.

### Day 1

If you do not want to have your students make their own set, a dice game set can be purchased from: <http://home.cshore.com/waaban/games.html>

### Engage:

Who here likes to play games? Has anyone ever heard of a game called *waltestakonok* or *waltestagn*? This is a dice game which is popular among the different tribes of the Wabanaki. This game is played by smacking a bowl against the ground to see if you can make your “dice” flip over. The dice were made out of pieces of deer antler rounded on one side, and flat with a design carved into the other side. Score is kept with fifty-one straight, skinny counting sticks, three Old Woman sticks—generally straight and wider than the rest of the counting sticks and one Old Man stick which is crooked.

### How to Make a Dice Set:

Today you are all going to make your own set of playing pieces which we are going to use over the next few days in our math class. Since we don't have any antler we can use, we are going to use clay to make the dice.

Creating a dice set:

- 1) If you don't think your students can handle creating the dice you can make and bake them ahead of time and just have the students create a design on the flat side.
- 2) Counting sticks can be made out of bamboo skewers which have been cut into thirds and have the sharp end removed. While not traditionally decorated you can have students color one end of their counting stick so



## Essential Questions

- How can graphs be used to present the results of a game?
- How can we use a graph to represent fractions?

## Academic Vocabulary

Percent  
Fractions  
Graphs

## Materials

Dice game set  
Copy of scoring sheet  
Data collection sheet.

they can tell which are theirs and not another students.

- 3) Three Old Woman sticks can be made out of tongue depressors.
- 4) One Old Man stick can be made from a popsicle stick and decorated.

If you don't have wooden bowls, and depending on how heavy the dice are, you can create bowls out of card stock using the template in this lesson. If you use actual wooden bowls to play this game, it is a good idea to place something like a folded up towel for the students to smack the bowl against to help deaden the sound. The game was traditionally played while sitting on the ground with a folded up blanket between the two players.

## How to play the dice game: simplified instructions

With the remaining time we have today we are going to play. A game of dice is played in three rounds and each round is scored differently. You are going to need a partner and one set of dice and counting sticks.

### Round One: Traveling

Each time you get a five-alike or six-alike, you get a certain number of sticks. A player's turn ends when they toss anything other than a five or six alike. Have the students play until one of them wins the Old Man stick (see scoring instructions below).

### Round Two: Drifting

After the Old Man is won, you enter the next phase of play. Now when you score a point, you move sticks from the pile each player collected in Round One into a second pile, or Treasure Pile. Students will play until one person (we'll call them player A) believes they have more sticks in their Treasure pile than their opponent (we'll call them player B) has in their first round pile. At this time player A tells player B to "pay up."

### Round Three: Paying Up

Counting sticks are taken from player B's Treasure Pile based on what player A has in their Treasure Pile (see scoring information below). For each counting stick in player A's Treasure Pile, player B now owes player A four counting sticks, and each Old Woman stick is worth sixteen counting sticks. Once all debt has been paid, if player B has no sticks left, player A is declared the winner. If player B still has between one and three counting sticks in their Treasure Pile, player B still has a chance to win the game by scoring a specific number of points before player A scores one point. This is done by tossing the dice again, each five-alike is worth one point and each six-alike is worth two points.

Does everyone feel comfortable with how to play this game? If they don't you may want to spend a few minutes the next day quickly going over the rules.

## Day 2

Depending on how much time you want to spend having the students collect



## State Standards

### Math Standards

#### Whole Number

Multiply single-digit numbers and divide using single digit divisors and up to two-digit dividends.

#### Rational Number

##### 4<sup>th</sup> grade

Compare, order, read, round, and interpret decimals with up to two decimal places.

##### 5<sup>th</sup> grade

Develop the concept of a fraction as division through expressing fractions with denominators of two, four, five, and ten as decimals and decimals as fractions.

### Data Analysis

##### 3<sup>rd</sup> grade

Students read, construct, and interpret bar graphs.

##### 4<sup>th</sup> grade

Students collect and represent data in tables, line plots, and bar graphs, and read and interpret these types of data displays.

##### 5<sup>th</sup> grade

Students read, construct, and interpret line graphs.

data to graph, you can change up the game and just do round one until one player thinks they have more sticks than their opponent and then have them call "pay up." At this time the students can calculate how many sticks they owe their fellow player.

Today we are going to keep track of what types of throws we get while playing the dice game. Each player is going to put a hash mark in the box to keep track of how many of either a five-alike or six-alike throws we get, because we are going to use this data later to create a graph.

Once the students have collected their data, have them select two colors and create a simple bar graph using either markers or a computer.

As an extension, you can introduce the idea of percent and have the students calculate what percentage of the throws were five-alike or six-alike, and have them represent that data in a graph as well.

## Evaluate:

### Rubric for Graph

Criteria	Novice (1)	Developing (2)	Standard (3)	Exemplary (4)
<b>Label</b>	Student did not use any labels on graph.	Student labeled title but did not label both axes.	Student accurately and clearly labeled title and one axis or both axis labeled but no titled.	Student accurately and clearly labeled title and variable on horizontal and vertical axis.
<b>Data Points</b>	1/4 or fewer data points are accurately plotted.	1/2 of data points are accurately plotted.	3/4 of data points are accurately plotted.	All data points are accurately plotted.
<b>Intervals</b>	None expected.	Student does not accurately use intervals on either axis.	Student accurately uses intervals on one axis.	Student accurately uses intervals on both axes.

## Recommended References:

Favour, Edith. "Indian Games, Toys, And Pastimes Of Maine And The Maritimes." Abbe Museum. 1974. Accessed November 2, 2015. <http://abbemuseum.org/downloads/AbbePublications/IndianGamesToysandPastimesofMaineandtheMaritimes.pdf>.

Tara, Prindle. "Bowl & Dice Game." Native American Technology & Art. 2010. Accessed November 2, 2015. <http://www.nativetech.org/games/bowl&dice.html>.



## Scoring Sheet

### Round One: Traveling

Roll	First toss	Second toss	Third toss
Five-alike	3 counting sticks	9 counting sticks	1 Old Woman stick
Six-alike	1 Old Woman stick	2 Old Woman sticks	3 Old Women sticks or the Old Man stick

If all the Old Woman sticks have been used, use 16 counting sticks in place of an Old Woman.

### Round Two: Drifting

Roll	First toss	Second toss	Third toss
Five-alike	1 counting stick	3 counting sticks	1 Old Woman stick
Six-alike	1 Old Woman stick	2 Old Woman sticks	1 Old Man stick

If all the Old Woman sticks have been used, use 16 counting sticks in place of an Old Woman.

### Round Three: Paying Up

Player A is the person calling “pay up.”

Player B is the person who has to pay the debt from their Treasure Pile.

For each counting stick in player A’s Treasure Pile, player B owes 4 sticks from their Treasure Pile  
For each Old Woman stick in player A’s Treasure Pile, player B owes 16 counting sticks from their Treasure Pile.

If after paying up player B is left with no counting sticks, player A wins.

If after paying up, player B still has 1, 2, or 3 counting sticks left, player B still has a chance to win the game.

Now player B must earn the following number of points before player A scores one point:

If player B is left with 1 counting stick, 7 points must be earned.

If player B is left with 2 counting sticks, 6 points must be earned.

If player B is left with 3 counting sticks, 5 points must be earned.

Roll	Any toss
Five-alike	1 Point
Six-alike	2 Points