

13.7 Modeling Randomness

Learning Targets for today



- ① To be able to understand random numbers.
- ① To be able to use probabilities in decision-making.

Making a fair Decision

Example for you...	Your turn to try...
<p>1. Two sisters are trying to decide who will unload the dishwasher in the morning. They decide to race, and the winner does not have to do the dishes. Is the result a fair decision?</p> <p>Unfair! ↳ Bigger, Older, stronger, quicker!</p>	<p>2. Two sisters are trying to decide who will unload the dishwasher in the morning. They decide to flip a coin and the person who gets the heads will have to do the dishes. Is the result a fair decision?</p> <p>Fair! Equally Likely Chance</p>

Random Number Table

* A random number table contains randomly generated digits from 0 to 9. You can use these numbers to model randomness for sampling purposes. Spaces are inserted between every 5 numbers to help with readability.

Random Number Table						
	87494	39707	20525	95704	48361	27556 34599
	14164	15888	24997	82392	08525	47551 37304
	61249	08241	16243	18371	03349	91759 53613
	67868	56747	73521	05975	40411	49493 70904

Using Random Numbers

Example for you...

1. A coach wants to select 3 of her 12 players at random to lead the team out onto the floor for their warm-up. The coach assigns each player a number from 01 to 12. Use the random number table to determine which players will be chosen.

07, 04, 12

Your turn to try...

1. At a birthday party the Mom wants to organize 8 little children into two teams. She assigns each child a number from 1 to 8. Use the random number table to divide the children into two teams.

Team #1
1, 4, 6, 5

Team #2
2, 3, 7, 8

Modeling with a Simulation

Example for you...

Got It? Suppose that you are playing a board game for which you must roll a 6 on a number cube before you are able to move your game piece from start. Describe a simulation you can use to predict the number of times you would expect to have to roll the number cube before you can move from start.

Know

You know you must roll a **6** on a number cube before you can move your game piece from **START**.

Need

You need to find a probability model that generates **6** equally-likely events.

Plan

You can use a spinner with **6** equal sections to simulate the number of times you have to roll the number cube before you can move from start.

1. **Step 1** The results of 5 trials are shown in the table. Complete the table to show the number of spins until the spinner lands on 6 for each trial.

2. **Step 2** The number of spins until **6** occurs for 20 more trials are shown below.

3, 8, 2, 11, 4, 4, 2, 6, 4, 7, 8, 2, 11, 3, 3, 1, 5, 1, 4, 12

3. **Step 3** Use the results from Steps 1 and 2 to find the average number of rolls until a 6.

$$\frac{108}{25} = 4.8$$

$$\text{TOTAL} = 25$$

4. On the average, you will need to roll **4.8** times until you can start the game.

Spins Until You Can Start Game Simulation

Trial	Individual Spin Results	Spins until 6
1	5, 1, 6	3
2	5, 6	2
3	3, 3, 6	3
4	3, 3, 3, 1, 5, 3, 2, 2, 6	9
5	1, 6	2