Math Virtual Learning

Math 7/Pre-Algebra

Theoretical and Experimental Probability

April 22, 2020

Grade 7/Theoretical and Experimental Probability
Lesson: April 22, 2020

Objective/Learning Target:

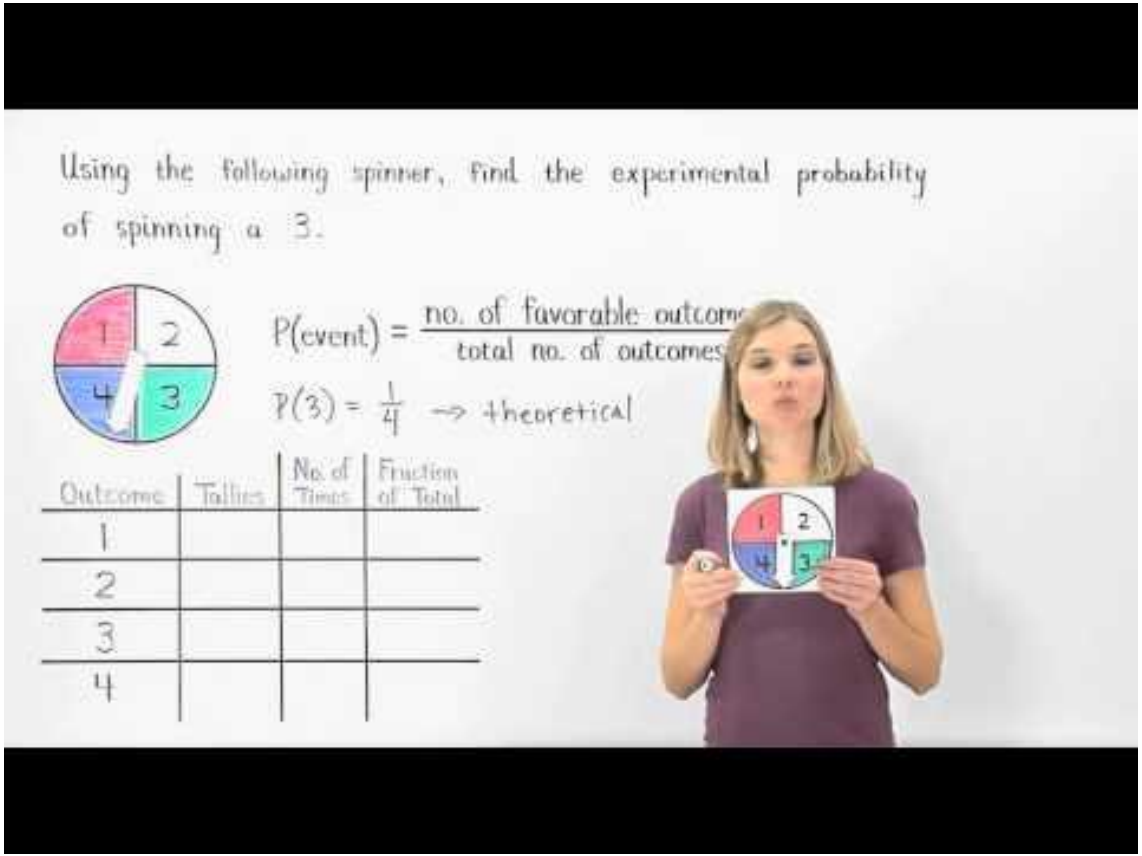
Students will solve problems involving theoretical and experimental probabilities.

Let's Get Started:

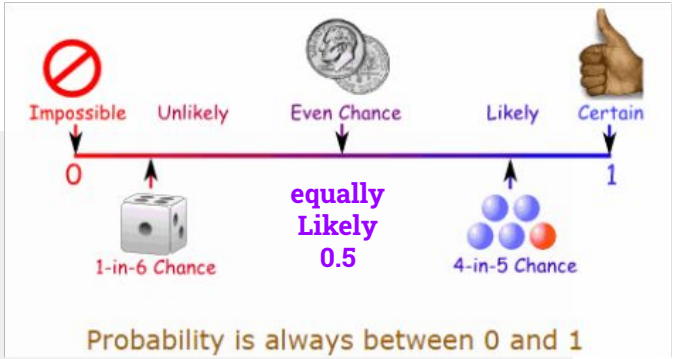
Click on the Link: Experimental Probability

Let's Get Started:

Click to watch the video.



Warm-Up



Read each question. Select *all* answers that apply.

1. Which event would have a probability of 0?
   a. Reaching into a bag of all yellow marbles and pulling out a yellow marble
   b. Reaching into a bag of all yellow marbles and pulling out a red marble
   c. Reaching into a bag of all yellow marbles and pulling out a marble

2. Which event would have a probability of 1?
   a. Reaching into a bag of all yellow marbles and pulling out a yellow marble
   b. Reaching into a bag of all yellow marbles and pulling out a red marble
   c. Reaching into a bag of all yellow marbles and pulling out a marble

3. Which event would have a probability of 0.5?
   a. Flipping a coin and getting heads every time
   b. Flipping a coin and getting heads half the time and tails half the time
   c. Flipping a coin and never getting tails

Warm-Up - Answer Key

Read each question. Select *all* answers that apply.

1. Which event would have a probability of 0?
   a. Reaching into a bag of all yellow marbles and pulling out a yellow marble
   b. Reaching into a bag of all yellow marbles and pulling out a red marble
   c. Reaching into a bag of all yellow marbles and pulling out a marble

2. Which event would have a probability of 1?
   a. Reaching into a bag of all yellow marbles and pulling out a yellow marble
   b. Reaching into a bag of all yellow marbles and pulling out a red marble
   c. Reaching into a bag of all yellow marbles and pulling out a marble

3. Which event would have a probability of 0.5?
   a. Flipping a coin and getting heads every time
   b. Flipping a coin and getting heads half the time and tails half the time
   c. Flipping a coin and never getting tails

Reminder

Probability

- How likely something is to occur
- ***Theoretical probability*** - what should happen
- ***Experimental probability*** - what happens when a situation is actually tested

- Probabilities are written as fractions:

  $\frac{\text{Probable outcomes}}{\text{Possible outcomes}}$ what we are looking for **everything** that could happen

Practice

Rolling a die experiment (aka a "random number cube")

Use a piece of paper to record your responses.

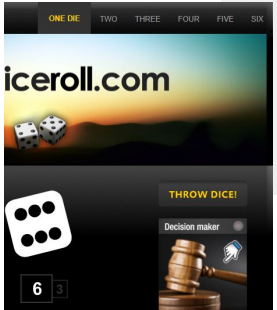
1.) What is the *theoretical probability* of rolling a ...

P(1) = P(2) = P(3) = P(odd #) =

4) = P(5) = P(6) = P(less than 5) =

Online Dice

For the online dice, make sure "ONE" is selected at the top. Click "THROW DICE" to roll the die.



2.) Next, use the dice link to roll the die 30 times. Record your results using tally marks on the chart below.

1	2	3	4	5	6

3.) What was the *experimental probability* of rolling a ...

P(1) = P(2) = P(3) = P(odd #) =

P(4) = P(5) = P(6) = P(less than 5) =

Reflection Time

Let's Think...

- In this situation, did any of the **theoretical** probabilities match the **experimental** probabilities?
- What do you think we would see if we rolled 100 times? 500 times? 1 million times?
- What does **theoretical** probability help us do?
- What does **experimental** probability show us?

Practice Answers

Rolling a die experiment (aka a "random number cube")

Use a piece of paper to record your responses.

1.) What is the *theoretical probability* of rolling a ...

P(1) = $\frac{1}{6}$ P(2) = $\frac{1}{6}$ P(3) = $\frac{1}{6}$ P(odd #) = $\frac{1}{2}$

P(4) = $\frac{1}{6}$ P(5) = $\frac{1}{6}$ P(6) = $\frac{1}{6}$ P(less than 5) = $\frac{4}{6} = \frac{2}{3}$

1	2	3	4	5	6

Answers will Vary depending on experiment

3.) What was the *experimental probability* of rolling a ...

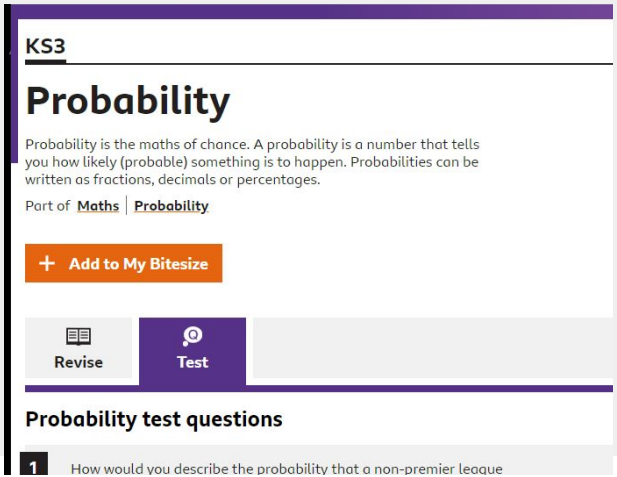
P(1) = P(2) = P(3) = P(odd #) =

P(4) = P(5) = P(6) = P(less than 5) =

Answers will Vary depending on experiment

Additional Practice

- Click on the link to test your probability skills!
  Probability Quiz
- Work through each question on a seperate piece of paper. Then, select the correct answer!
- After you have finished, push submit and check your answers.



Practice:

Answer the questions on a piece of paper.

Amanda used a standard deck of 52 cards and selected a card at random. She recorded the suit of the card she picked, and then replaced the card. The results are in the table below.

Diamonds	𝍸 ||
Hearts	𝍸 ||||
Spades	𝍸 𝍸 |
Clubs	|||

$$\text{Theoretical Probability} = \frac{\text{Number of favorable (desired) outcomes}}{\text{Total number of possible outcomes}}$$

$$\text{Experimental Probability} = \frac{\text{Number of Event Occurrences}}{\text{Total Number of Trials}}$$

1. Based on her results, what is the experimental probability of selecting a heart?
2. What is the theoretical probability of selecting a heart?
3. Based on her results, what is the experimental probability of selecting a diamond or a spade?
4. What is the theoretical probability of selecting a diamond or a spade?
5. Compare these results, and describe your findings.

Practice Answers

Amanda used a standard deck of 52 cards and selected a card at random. She recorded the suit of the card she picked, and then replaced the card. The results are in the table below.

Diamonds	𝍸 ||
Hearts	𝍸 ||||
Spades	𝍸 𝍸 |
Clubs	|||

1. Based on her results, what is the experimental probability of selecting a heart?

   9 out of 30 OR 30%

2. What is the theoretical probability of selecting a heart?

   13 out of 52 OR 1 out of 4 OR 25%

3. Based on her results, what is the experimental probability of selecting a diamond or a spade?

   18 out of 30 OR 9 out of 15 OR 60%

4. What is the theoretical probability of selecting a diamond or a spade?

   26 out of 52 OR 1 out of 2 OR 50%

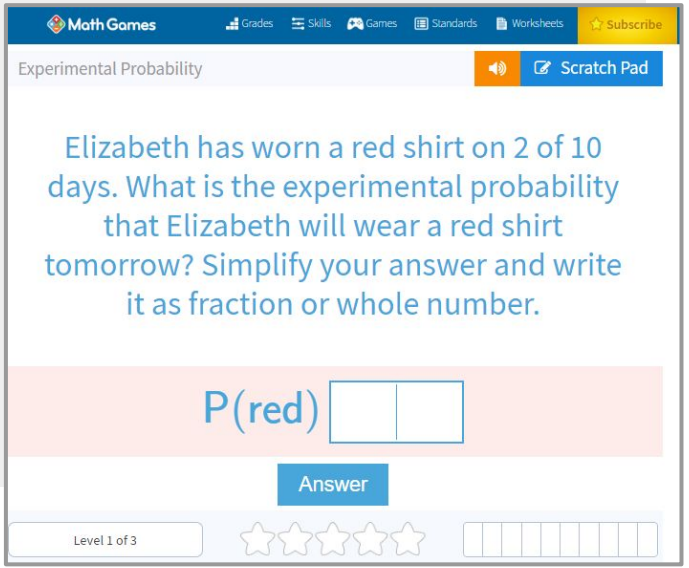
5. Compare these results, and describe your findings.

   Answers will vary

Additional Links

[Experimental Probability Practice - Math Games]

- ❏ Click on the link above.
- ❏ Type your answer in the box in ***fraction form*** using the **/** as the fraction bar.
- ❏ Click answer to see if you were correct.
- ❏ **Remember** to **simplify your fraction**. If you don't simplify, your answer will be counted wrong.

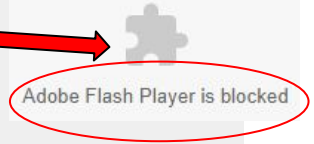


Additional Links

[Toads and Vines Probabililty Board Game]

- ❑ Click the link above.
- ❑ This game is a probability version of **"Chutes and Ladders"**
- ❑ If needed, fix the "Adobe Flash Player" using the directions below.

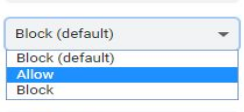
To fix the "Adobe Flash Player", click on the  to the left of the web address bar.



Click on "Site Settings."

Scroll down to find 

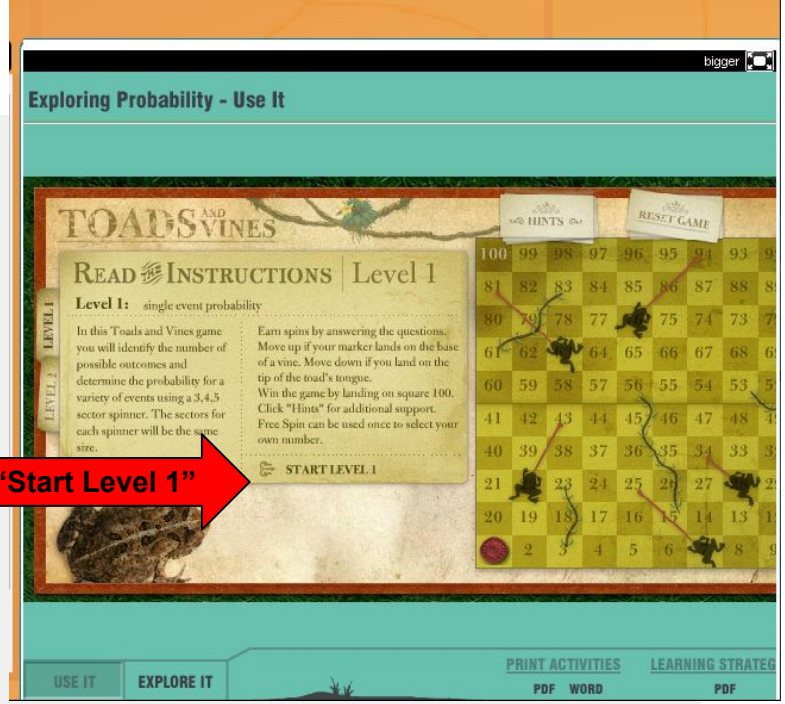
, then click on "Block (default)" and change it to "Allow."



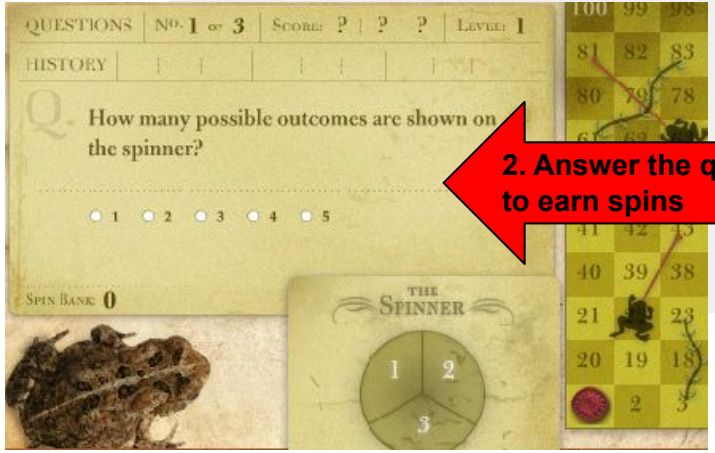
Refresh your game screen by pressing  , and then you can play.

See next slide for "How to Play."

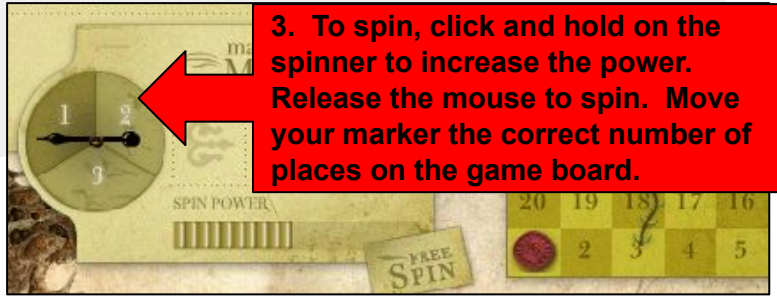
How to Play
"Toads and Vines"



1. Click "Start Level 1"



2. Answer the question to earn spins



3. To spin, click and hold on the spinner to increase the power. Release the mouse to spin. Move your marker the correct number of places on the game board.