

Probability - with fruit

Zeb Hammond June 4, 2020



- Data Analysis,
Statistics and and
Probability

- Common Core State
Standards

[CCSS.MATH.CONTENT.7.SP.A.1](#)

- Missouri Learning Standards
(MLS)
- 7.DSP.C.5a

Objective: What you'll learn

DEVELOP, USE AND EVALUATE PROBABILITY MODELS.

Investigate the probability of chance events.

- a. Determine probability of simple events.**
- b. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.**

Key terms:

Probability is the branch of mathematics concerning numerical descriptions of how likely an event is to occur or how likely it is that a proposition is true.

Probability is a number between 0 and 1, where, roughly speaking 0 indicates impossibility and 1 indicates certainty.

Materials

- 1 basket
- 1 apple
- 3 pears
- 4 peaches
- 8 persimmons

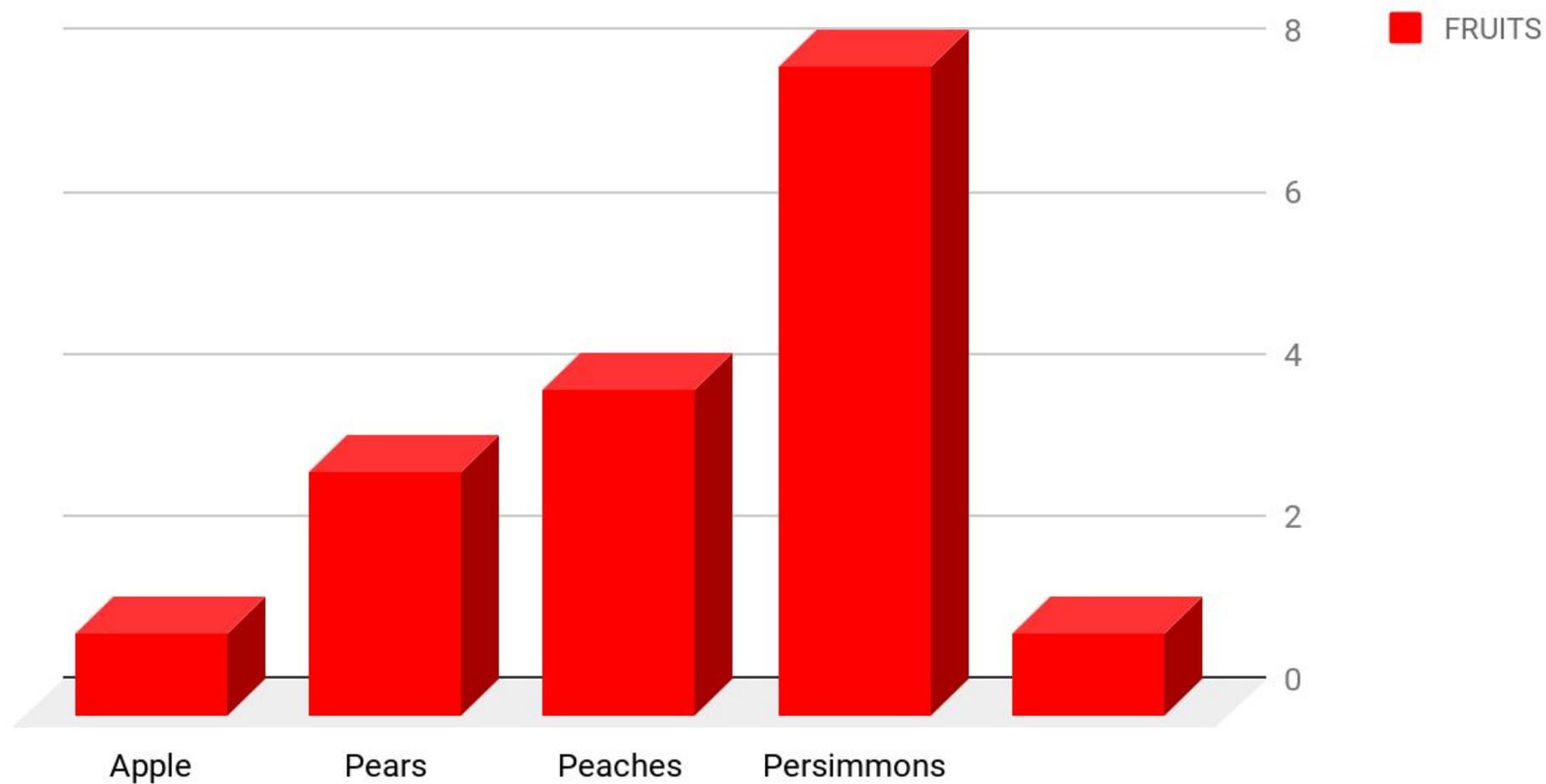
Prior Knowledge Needed

- Students will need to be able to identify and distinguish the different fruits used in this lesson (apple, peach, pear, persimmon)
- Students will need to know how to set up a fraction
- Students will need to know how to round to the thousandths place

After a long hike through the woods, Sean gathered many types of fruits in his basket, including 1 apple, 3 pears, 4 peaches, and 8 persimmons. When he returned home, Sean wanted to show his father what was in his basket.



Total Fruit



Let's look at probability of grabbing an **APPLE** out of the basket.

First-How many **APPLES** are in the basket? (1)

Next-Let's count how many total fruits are in the basket:

1 APPLE + 3 PEARS + 4 PEACHES + 8 PERSIMMONS = (16 total fruits)

$$\frac{1 \text{ APPLE}}{1 \text{ APPLE} + 3 \text{ PEARS} + 4 \text{ PEACHES} + 8 \text{ PERSIMMONS}} = \frac{1}{16} = 6.25\%$$

Sean has a 6.25% chance of grabbing an **APPLE** out of the basket first.

Let's look at probability of grabbing a PEAR out of the basket.

First-How many PEARS are in the basket? (3)

Next-Let's count how many total fruits are in the basket:

1 APPLE + 3 PEARS + 4 PEACHES + 8 PERSIMMONS = (16 total fruits)

$$\frac{3 \text{ PEARS}}{1 \text{ APPLE} + 3 \text{ PEARS} + 4 \text{ PEACHES} + 8 \text{ PERSIMMONS}} = \frac{3}{16} = 18.75\%$$

Sean has a 18.75% chance of grabbing a PEAR out of the basket first.

Now it's your turn!

Each student come up and grab one piece of fruit out of the basket. After you choose your fruit, write down the type of fruit you grabbed on a piece of paper and compute the probability of grabbing that fruit. Remember, there's 1 apple, 3 pears, 4 peaches, and 8 persimmons in the basket.

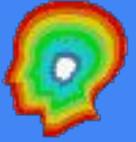
After everyone has figured out their probability, we will compare our answers as a class to see if the percentages are higher or lower than the actual probability.

**IMPORTANT!! Put the fruit back
into the basket !**

Brain challenge

Why is this important?





Brain challenge

Why is this important?

If you don't put the fruit back each time the total number of fruits (your denominator) will be one less each time and the probability will change

Come back to learn more about that in a future lesson ...

Class results

Fruit	Number selected	Probability Observed	Probability (from basket)
Apples			6.25%
Pears			18.75%
Peaches			25.00%
Persimmons			50.00%

What if I don't have a basket?

http://growingmath.org/widgets/random_sample/random_fruits.html

Click on this link for a random fruit basket generator!

Enter the number of apples, peaches, pears and mangoes
in your basket



Conclusion

When figuring out the probability of something occurring, you first need to figure out what it is you want to know. In our case, it was picking an apple out of the basket first. We had one apple, so that number will be the numerator (number on the top of a fraction line)

Next, we have to figure out our possible outcomes or sample size. How many total fruits were in the basket. We had a total of 16 fruits. This number will be the denominator (number on the bottom of a fraction).

Conclusion

When figuring out the probability of something occurring, you first need to figure out what it is you want to know. In our case, it was picking an apple out of the basket first. We had one apple, so that number will be the numerator (number on the top of a fraction line)

Next, we have to figure out our possible outcomes or sample size. How many total fruits were in the basket. We had a total of 16 fruits. This number will be the denominator (number on the bottom of a fraction).

Once you have those two numbers, you divide the numerator by the denominator. This will give you a number as a decimal. This is the probability.

After getting the probability, you multiply it by 100. This will then give you a percentage of times on the average an event will occur.

What is the probability you'll get a kiwi?

?



What is the probability you'll get a kiwi?

The probability that you will get a kiwi out of a basket of fruit with no kiwi is 0.

Something with a 0 probability is also referred to as _____



If you didn't know, now you know

Kiwi fruit is seldom grown in Midwestern states like Missouri because the climate fluctuates so much

Kiwi trees will begin to bloom, then when it gets cold again, the buds will suffer frost damage



Annie's family has an apple orchard

Annie gathers a basket of fruit, too, but because Annie's family has an apple orchard, her basket is full of nothing but apples.

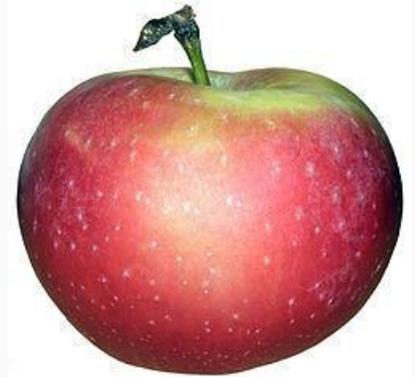
If you pull a piece of fruit out of her basket, what is the probability it will be an apple?

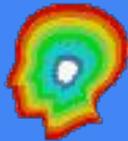


What is the probability you'll get an apple?

The probability that you will get an apple out of a basket of fruit with only apples is 1.

Something with a 1.0 probability is also referred to as _____.
It will happen 100% of the time.





Brain challenge

Create your own probability problem.

Here's how:

Find 4 or 5 different items in your house of similar size. This could be different types of pasta, different kinds of cookies, beans (dry beans, the canned kind would be messy!)

Put a total of 25 of these items in a bag.

Compute the probability of getting each type of item.

Have your friends or family pull items out of the bag and record how many of each they have selected

Your table

Items	Number selected	Probability Observed	Probability (from basket)

Example

Cereal	Number selected	Probability Observed	Probability (from basket)
Cheerios	10	40%	44%
Lucky Charms	4	16%	20%
Fruity Pebbles	7	28%	28.00%
Trix	4	16%	8.00%
	25	100%	100%

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Trix	4	16%	8.00%
	25	100%	100%

Hint: If your probabilities do not add up to 100% you made a mistake!

Example