Experiencing Probability & Statistics with Teddy Bears!

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**ACTM 2014 Fall Conference**

**Presented By**

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**Teddy Bears**

This problem gives you a chance to:

* Collect data using experimental probability
* Interpret probability information
* Solve probability problems in context
* Graph theoretical probability using the rate of change.

Gina has a bag containing Red, Green, Blue, Yellow, and Orange teddy bears.

She has 4 Red teddy bears, 3 Green teddy bears, 2 Blue teddy bears, 2 Yellow teddy bear, and 1 Orange teddy bear.

1. (a) With a partner and using the information given, make 24 withdrawals from the bag replacing the teddy bear each time and write down the color of each teddy bear withdrawn in the frequency table below.

Teddy Bears

|  |  |  |
| --- | --- | --- |
| Color of Teddy Bear | Tally | Frequency |
| Red |  |  |
| Green |  |  |
| Blue |  |  |
| Yellow |  |  |
| Orange |  |  |

(b) Draw a Histogram, Circle Graph, and a Line Plot using the data in the frequency table.

(c) What is the probability of each color based upon your experiment? (Experimental Probability)

(d) What should be the probability of each color? (Theoretical Probability)

(e) How do they compare?

Gina’s older brother Tom decided that he would add some additional teddy bears in her bag. Tom refused to tell her how many he added, but did provide the following clues.

If someone picks a teddy bear without looking:

* the probability of picking a Red teddy bear from the bag is one half
* the probability of picking a Green teddy bear is half the probability of picking a Red teddy bear
* Blue, Yellow and Orange teddy bears have an equal probability of being picked.
1. (a) Use this information to complete the table.

Show how you worked out your answers.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Color | Red | Green | Blue | Yellow | Orange |
| Probability | 12 |  |  |  |  |

(b) Suppose there are 36 teddy bears in the bag. How many of each color are there? Show your work.

1. Tom finally tells Gina that there are 24 Green teddy bears in the bag.

 How many teddy bears are there all together in the bag? \_\_\_\_\_\_\_\_

1. Gina wants to raise funds at her school fair.

She plans to charge $.10 to pick a teddy bear from her bag without looking.

She will give:

 $.20 to anyone who picks a Blue teddy bear

 $.50 to anyone who picks a Yellow teddy bear

 $1 to anyone who picks an Orange teddy bear

 Anyone picking a Red or Green teddy bear will lose their money.

1. Using the chart in Question #2, explain why Gina will most likely lose money with this game.

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1. How much should Gina charge to pick a teddy bear so that she can make money from her game? \_\_\_\_\_\_\_\_\_\_

Explain your answer.

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1. Explain how Gina can change her game so that she can still charge $.10 and make money?

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1. Tom tells Gina that he will give her $5 toward her fundraiser if she can determine a general rule for the number of red teddy bears there are for any number of teddy bears in the bag. He also tells her that he will give an additional $3 if she can graph the relationship on a coordinate plane. Gina notices that for 6 teddy bears she has 3 red ones, for 8 teddy bears, she has 4 red ones, etc. Find and graph a solution that will allow Gina to collect the money from Tom.