Take a Chance

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TAKE A CHANCE

by Laura Parks
illustrated by Katy Bloom
Cole was rarely sure of anything, but today he knew that something just did not add up. His teacher, Miss Peartree, seemed slightly distracted. Cole was certain that today was not a typical school day.
Cole sat and listened as Miss Peartree reviewed what they had learned about probability. "Remember," she began "an event is only IMPOSSIBLE if there is no way that it can happen. On the other hand, an event is POSSIBLE if there is a way that it can happen. If there is only a small chance that an event will happen it is UNLIKELY, but if there is a strong chance that it will happen then the event is LIKELY. An event is CERTAIN only if it will definitely happen. For example, I am certain that there will be a carnival after school today."
Mutterts of wonder and excitement broke out in the classroom. Everyone wanted to know all about the carnival.

"I have more to tell you!" Miss Peartree's voice broke through the chatter. "You will each receive 10 tokens to participate in the activities at the carnival. If you choose to play a game, you may win prize tickets. These tickets can be exchanged later for prizes. There will also be a grand prize for one winner. Our class hamster, Chester, needs a new home. The grand prize winner will get to keep him!"

The classroom fell silent. No one could think of anything except keeping the beloved classroom pet. Cole even considered what he would do if he won. Just then, a familiar voice interrupted his thought. "Miss Peartree, we all know that I am going to win the grand prize. Everyone else is just wasting their time." It was Maya, the smartest girl in the class.

"Now Maya," Miss Peartree replied, "everyone has a chance to win the prize. It is all left up to the power of probability!"
Cole could not focus for the rest of the day. He kept thinking about what Miss Peartree said. I guess it is possible for me to win the prize, he thought. Where there is probability, there is chance!
When the bell rang, the class raced outside. Cole could not hold in his excitement when he saw everything that was set up for the carnival. He looked around at all of the games that he could play. "I need to choose the games that have the highest probability of winning prize tickets," he thought. Just then, he noticed his best friend Todd waving to him from the face painting booth. "Cole, I'm going to be a tiger! Don't you want to get your face painted too?" he asked his friend.

Cole thought long and hard. Face painting costs 3 tokens, and there are no prize tickets to earn. That means that it is IMPOSSIBLE for me to win prize tickets if I get my face painted. "Sorry Todd," he told his friend. "I need to work on winning that prize!"

"Maybe I could help," said Todd. "I know a lot about probability." "That would be great!" Cole replied.
Cole noticed his second grade teacher, Mrs. Gordon, at a table with 3 cups on it. The sign read "Find a Feather - 3 tokens"

"How do you play this game?" Cole asked.

"There are feathers hiding underneath 2 of these cups," Mrs. Gordon explained. "You have to guess which cup is covering a feather. If you guess correctly, you will receive 5 prize tickets."

Cole turned to Todd. "What is the chance that I will win this game?" he asked.

"There are 3 cups, and two of them have a feather underneath. If you guess, it is LIKELY that you will find a feather."

"I want to play," Cole said proudly. Mrs. Gordon was delighted. She collected 3 of Cole's tokens and asked him which cup he thought the feather was under. "I am going to take a chance and guess that there is a feather under the blue cup!" he announced. As Mrs. Gordon's hand reached for the blue cup, Cole's heart began to race. She lifted the cup to reveal...
A feather! When he realized that he won the game, Cole jumped up and down, clapping his hands. "Congratulations, Cole!" Mrs. Gordon said, handing him 5 prize tickets.

"That was great, Todd!" Cole said. "What game should I play next?"

"There is a big crowd over at that game," Todd suggested, pointing to a table next to the playground.

"Let’s check it out!" Cole exclaimed.
As Cole came closer, he realized that this game that had drawn such a large crowd was a colorful wheel that spins. The sign above it read "Wheel of Wonder - 2 tokens." He heard the man running the game explaining it. If the wheel lands on the color yellow, you win 8 tickets. "What are the odds I will win this game, Todd?" Cole asked.

Todd replied, "There are 6 equal sections of the wheel, but only one of them is yellow. It is UNLIKELY that you will win, but it is still possible." Cole thought for a moment. It would not be likely for him to win the game, but it looked like fun. He decided to try playing Wheel of Wonder.

When it was finally Cole's turn, he handed the man his tokens, took a deep breath, and spun the wheel with all his might. Gradually, it began to slow down until it was moving one spoke at a time. Cole was so nervous he could not watch. He closed his eyes tightly and hoped the wheel would land on yellow. When he heard it stop spinning, he opened his eyes to find the pointer on...
Yellow! The crowd cheered as a smile spread across Cole's face. "Way to go!" the man said, handing Cole 8 tickets. Wow! Cole thought. I am getting closer and closer to that prize!
"All this winning is making me hungry," Todd said. "I think it is time for a snack." As Todd got in line at the popcorn stand, Cole scanned the carnival for more games to play. He noticed his little sister Anna picking a duck up out of a wading pool. Cole remembered that game from when he was Anna's age. He would pull a duck out of the pool, and he would get a prize. Since Anna would definitely win a prize just because she pulled a duck out of the pool, Cole was CERTAIN that she would win. He wished he could play a game that was easy to win, but he was too old.
Cole continued to look for games for third graders. That is when he spotted Maya. She was counting a handful of tickets. "Wow Maya! It looks like you have been winning a lot of games," he told her.

"Oh, hi Cole," she replied, barely looking up. "Yes, I already have 15 tickets, and I heard that the first person to get 20 tickets gets to take Chester home. Since I only need 5 more tickets, it is very likely that I will win." She smiled. "I'm going to go win those last few tickets!" Maya skipped off happily.

"Don't listen to her, Cole." Todd's voice rang out loudly behind him. "You have been winning a lot of games so far. You have a good chance of winning that prize."
"You're right, Todd. Let's see what this game is!" Cole exclaimed as he approached a table with a die on it. Sitting at the table was Miss Peartree. She explained how to play the game. "You have a die. You have to choose a number between 1 and 6. Then, you roll the die. If the number that you roll matches the number that you predicted, you win 6 tickets."

Cole thought about all of the possibilities. He knew that each die has 6 sides, each with the numbers 1 to 6. There is an equal chance of rolling each number on the die. That means that he was UNLIKELY to roll any particular number. He asked Todd what he thought he should do. "My lucky number is 3," Todd said. "This is not about luck, though. This is about probability. I am going to choose the number 4." Cole handed Miss Peartree 4 tokens and picked up the die. Cole tossed the die in his hands before gently rolling it onto the table. When it landed, Cole counted the dots. He was very excited to find that he rolled a 4. "Great job!" Miss Peartree said, handing Cole 6 tickets.
Cole counted all of the tickets that he had so far. He'd won 5 tickets from guessing the cup with the feather under it, 8 tickets from spinning the color yellow on the wheel, and now 6 tickets for rolling the number that he had guessed on the die.

"Hey Todd, what does 5 + 8 + 6 equal?" he asked his friend. Todd took a wrinkled piece of paper out of his pocket and a pencil from behind his ear so that he could add the numbers together. "According to my calculations," Todd began, "you have 19 tickets."

"Wow!" Cole exclaimed. "I have 19 tickets and I need 20 to win the hamster. That means that I only need 1 more ticket!"
Cole looked around for more games to try. There was just one game that he had not played yet. He noticed the sign: "Toss-Up - 2 tokens." His heart sank. Cole only had one token left, which would not be enough to play any more games.

Just then, Cole heard someone crying. He turned around to find Maya, tears streaming down her face. "What's wrong, Maya?" Cole asked her, concerned.

"I was so close." Maya choked through her sobs. "I only needed one more ticket to win that grand prize, but I don't have enough tokens to play this game. Not that you care. Go ahead and claim that prize. You earned it." Maya hung her head in defeat.

Cole looked at Maya. "Actually, I'm not going to win the hamster either. I only have one token left, and I need one more ticket too."
Maya sniffled as she put her head in her hands. Cole sat down beside her and thought for a moment. "Unless..." he said.

"Unless what?" Maya asked, intrigued.

"Well," Cole began, "We need 2 tokens to play the game. I have 1 and you have 1. If we combine our tokens, we will have 2, and then we could play together."

Maya thought about this idea. "We would have to share Chester if we win," she said.

"When we win," Cole corrected her, "we could share the hamster. I'm in if you're in."

"You sound like you're certain that we will win," Maya commented.

"I know that it is not certain that we will win. But since the coin has two sides, we have an EQUAL chance of winning as we do of losing. Where there is probability, there is chance! This is a chance that I am willing to take. What do you say?"

Maya hesitated a moment. At last, she replied, "Alright. But we better win."
Together, Cole and Maya approached the table where Mr. Morris, the school custodian, collected their two tokens and handed them a penny. "All you have to do is flip the coin," he told them. "If it lands on heads, you win 2 prize tickets."

"Are you ready?" Cole asked Maya, reaching out his hand. Confidently, she placed her hand in his with the penny on top. "Let's win that prize!" Maya exclaimed.
Together, they counted to three and tossed the penny upwards. Watching the coin turn in the air was like watching a movie in slow motion. Finally, it landed on the table. Cole and Maya watched eagerly as the penny came to a stop.

"I don't believe it," Cole said. "It's... it's..."

"Heads!" Maya shouted.

"Congratulations!" Mr. Morris said to them, handing them 2 tickets. Cole gave Maya one of the tickets, holding onto one for himself. "I could not have done it without you!" he told her.

"Likewise," she said, giving Cole a high-five. "Now let's go get that hamster!"
Cole and Maya walked up to the prize table together. "We each have 20 tickets," Maya informed the woman in the chair.
"Which one of you won the tickets first?" the woman asked.
"Actually, we worked together," Cole explained.
The woman looked concerned. "We did not predict that this would happen, and we only have one hamster to give as a grand prize," she told them.
Maya looked at Cole, then back at the woman. "We know. We are going to share Chester," she announced.
"How wonderful!" the woman exclaimed.
Cole walked over and picked up Chester's cage. The hamster stopped running on the wheel to look at his new owners. "Hi Chester! We are going to take you to your new home!"
And they did.
Suggested Activities for Parents and Teachers

Designing Probability Games

1. Coin Toss

Tell the children that you are going to flip a coin. Ask if they think it will land on heads or tails. Flip the coin and ask the child if his/her prediction came true. Ask the child to predict which side it will land on more often if it is flipped 10 times. Ask which it will land on more if flipped 100 times. Try flipping the coin 10 times, then 100, recording how many times it lands on each side. Ask the child if his/her predictions were close to what actually happened.

Standard: CCSS.Math.Content.7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

2. Spin-a-Color

Create a spinner game by dividing a paper plate into sections (such as fourths) and use markers or crayons to color each section. Place a dot in the center of the plate using a black marker. In order to use the spinner, place a paperclip on the plate and hold it in place using a pencil. The point of the pencil should be touching the black dot in the center of the plate. You can then flick the paperclip with your other hand. When it stops spinning it will land on a color. Children can decide which colors it would be impossible, possible, likely, or certain for the spinner to land on before spinning. Children then spin the spinner several times, recording how many times it lands on each color. Children can then reflect on how their predictions compared to the results they found.

Standard: CCSS.Math.Content.7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

3. Mystery Bag

Give each child a brown paper bag and a variety of different colored buttons or tiles. Tell children to place a few colored tiles in the bag and shake it to mix it up. Ask children questions about their bag:
Which color are you most likely to pull out of the bag? Which color are you least likely to pull out of the bag? Are there any colors that you have equal chance of choosing? Which color would it be impossible to choose from the bag? Would you be more likely to choose a (red) or a (blue) tile from the bag?

Standard: CCSS.Math.Content.7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
4. You're On a Roll!

Label small wooden blocks with any variations of the following: 1,1,2,2,2,3. Ask children to predict which number they will roll the most often and which number they will roll the least often. Give each child a sheet of graph paper labeled with each number. Ask them to roll the die and record the number they rolled on the graph. Children should repeat this activity until they reach the top of the graph for one number. Ask children to explain which number they rolled most often and which number they rolled least often. Were they the same numbers that they predicted?

Standard: CCSS.Math.Content.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

Adapted from:

Numbers and Operations Activities

1. Cole is learning to take care of Chester the hamster. Chester needs to be fed 3 times each day. He eats 2 tablespoons of hamster food at each meal. How many tablespoons of hamster food does Chester eat in one day? What about for 1 week?

Standard: CCSS.Math.Content.4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

2. Maya wants to buy hamster food for Chester. Each bag contains 100 tablespoons of hamster food. How many bags would she need to buy in order to feed Chester for 2 weeks? For 3 weeks? For 4 weeks?

Standard: CCSS.Math.Content.4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Measurement:

Cole and Maya want to put a hamster hut in Chester’s cage. The dimensions of the hamster hut are 8 inches by 3 inches. The dimensions of the cage are 16 inches by 11 inches. Will the hamster hut fit in the cage?

Standard: CCSS.Math.Content.4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
About the Author

Laura Parks is a pre-service teacher with a passion for mathematics. Take a Chance is Laura’s first book. She decided to write it after researching mathematics-related children’s literature. Laura has enjoyed writing her first children’s book and plans to continue writing in the future. When she is not writing, Laura enjoys cooking, playing the guitar, and, of course, teaching.

About the Illustrator

Katy Bloom is an emerging young artist. One of her interests is illustrating, and Take a Chance is her first foray into children’s book illustration. Some of Katy’s other activities include spending way too much time on her computer as well as making new foods, reading, and singing.