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March Madness Maths

Introduction:

Every year a basketball tournament is held across the United States that is called March Madness! The tournament is usually held from March – April each year. It is a women's and men's basketball tournament run by the National Collegiate Athletic Association (NCAA).

This year the tournament was especially interesting for me, as I had started to collaborate with a Davidson College mathematician called Tim Chartier. Tim is currently serving as the Distinguished Visiting Professor at MoMath - the Museum of Mathematics in New York. Tim is fascinated by sports analytics and has a great book about data in sports, called *Get in the Game!* Tim made a video for us that accompanies the questions below, which should interest any student who is learning about probability.

Task:

1. Share the tournament bracket image with the class. (page 3) Ask students, What do you wonder and/or know about the image? Then ask them to chat with a partner or small group. Ask students to share what they discussed. A few key understandings students should get from this discussion are how each game is listed and how many games are played in the first, second, third, fourth, and fifth rounds. The beginning of this activity, as shared in the video, focuses on picking the winner for each of the 16 games played on the first day of the tournament. The first day of the tournament represents half of the games played in the first round of 64 teams.

2. Share with students that to tackle large problems, mathematicians often look at smaller cases that are easier to work with to understand the original problem better. Play the video from mathematician Tim Chartier for the class. Pause the video at 1:37 where Tim asks students to flip a coin 16 times to simulate randomly picking the winners for the first round represented on one side or half of the bracket. Students can flip a coin and record the results or use a google tool at https://g.co/kgs/A1dv7K to generate coin flips. As a class, discuss the group results. How many groups got all heads - which means they picked the winner of each game? You might choose to collect the number of games won in the simulation for each group and display them side by side discussing similarities and differences. Ask students, how easy do you think it would be to pick the winner of each match in the tournament represented by the entire bracket?

Dr. Tim Chartier

3. Play the remainder of the video and ask students, What are the chances of choosing the winner of every game in the entire tournament?

Extension activities/questions:

- Tim shared how he turned 4.2 billion seconds into years and helped us get a sense of how unlikely it is to correctly guess every game in the first round. Can you think of another useful metaphor to explain to a friend how small the chances of guessing every game correctly are?

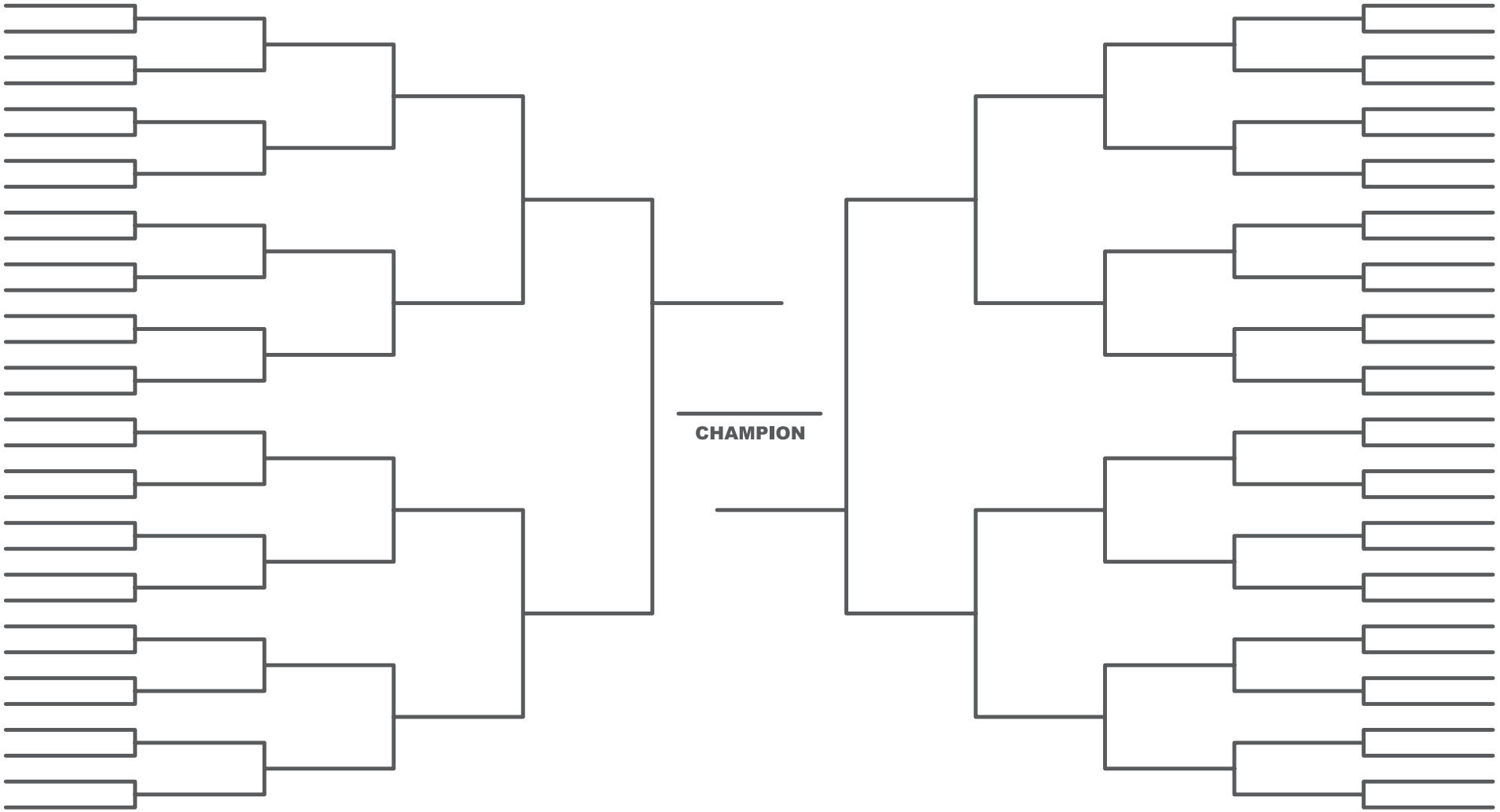
- With a tournament that begins with 64 teams, we have never seen anyone get a full bracket correct. How big (or small) do you think the tournament would have to be so that a few people get a full bracket correct each year? As you work on your answer, you will likely have to estimate or research some numbers and make some assumptions. Make sure to record those clearly so you can remember where your answer came from. Is your answer like others'? How did your assumptions vary?

- Decide on a way to choose the winner of each game in the bracket. Simulate one or more bracket results and compare them to a previous men's or women's March Madness Tournament. How many games did you predict?

- The Tournament Bracket uses a pairing system for teams ranked 1 through 16 for the four different regions. Develop your own system for picking the winner of each game. Test your results against previous tournament results. (page 4)

- What other questions do you want to study about the March Madness women's and men's brackets?

TOURNAMENT BRACKET



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