STATISTICS

Description

Students learn about mathematical and statistical analysis of baseball records (i.e., sabermetrics) by analyzing data on baseball cards. This analysis includes offensive (batting average, slugging percentage, etc.), defensive (fielding percentage, errors, etc.), and pitching statistics (ERA, WHIP, etc.).

Objectives

Level 1

- Students will review statistics.
- Students will discuss the meaning of statistics.

Level 2

- Students will calculate batting average.
- Students will determine when an average will vary more.

Level 3

- Students will choose players to trade based on statistics.
- Students will justify their trades.

Discussion Questions

1. What is the most important statistic in baseball?
2. Who is the best player in the major leagues? On the Royals?
3. Are home runs more important than batting average?

Assessment Questions

1. Name the numerator and denominator in the formula for batting average.
2. Answer: Numerator is hits, denominator is at bats
3. What is better, higher or lower batting average?
4. Answer: Higher is better
5. If a player has 5 hits and 20 at bats, what is their batting average?
6. Answer: 5 / 20 = .400

Key Concept

Batting Average = hit / at bats

Materials

- Dice or can use: https://www.random.org/dice/
- Baseball Cards

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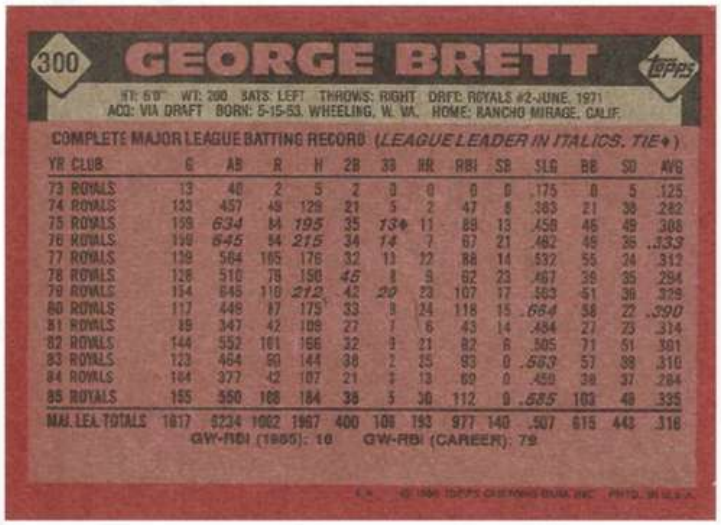
Set Up

1. Watch Baseball Statistics video below:

https://youtu.be/_okRi5Pr8Ns

2. Part I: Baseball card contents

- Distribute one baseball card to each student. Note that most baseball cards are for offensive positions, and therefore the statistics are for hitting and fielding (see cards below). Some of the baseball cards are for pitchers, which only contain pitching statistics. This lesson focuses on players in offensive positions.
  - Students will answer the questions below:
    1. In what year was George Brett's highest batting average?
    2. In what year was George Brett's lowest batting average?
    3. What is the highest number of hits George Brett had in a single season?
    4. What is the average number of home runs George Brett hit over his 13 MLB career?



3. Part II: Calculating your batting average

- Distribute dice and Baseball Statistics Worksheet to each group.

Roll #	Hit	Out
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Procedure

1. Watch Batting Average Activity video below:

Part I: Baseball Card Contents

- Present the concept of averages.
  - Equation for Batting Average = Hits / At Bats
- Calculate batting the averages for the following scenarios:
  - 5 hits out of 10 at bats (answer = 0.5 or 50%)
  - 40 hits out of 100 at bats (answer = 0.4 or 40%)
  - 200 hits out of 1,000 at bats (answer = 0.2 or 20%)

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- Use the statistics from the baseball card(s) to discuss how good a player is based on his batting average (column labeled “AVG” or “BA”). Discuss the influence of the at bat (AB) value in establishing a useful indicator of the quality of a player. Example: with 1 hit and 1 at bat, a player is hitting 1.000. How does that compare to a player with 50 hits after 100 at bats?
- Compute the batting average per season using the data in the Hits column (labeled “H”) and At Bats column (labeled “AB”) for your player.

Part II: Calculating Your Batting Average

- To give students additional practice setting up fractions similar to batting average, have students work in groups.
- Provide each group with the baseball statistics Worksheet 3.1 and a single die.
- Determine which number(s) between 1 and 6 would result in a “hit”. The remaining numbers would result in an “out”. The goal of this activity is for students to see how often they roll a die and get a “hit” (1 out of 6 chances, or 2 out of 6 chances depending on how many numbers are labeled as “hits”).
- Appoint a “scorer” for the group and a “pitcher”. The “pitcher” will roll the die 10 times. After each roll, the “scorer” will mark if each roll resulted in “hit” or “out”.
- Count the number of times the roll turned up “hit”.
- Set up a fraction showing the average number of rolls that turned up “hit” and compute the average:
  - Average number of rolls landing on “hit” = number of “hit” results/total number of rolls
- Have students create graphs showing the results of each station.