****Batting Stats****

**R (Runs Scored)**

**Number of runs scored.**

**H (Hits)**

**Total number of hits.**

**2B (Doubles)**

**Number of doubles.**

**3B (Triples)**

**Number of triples.**

**HR (Home Runs)**

**Number of home runs.**

**RBI (Runs Batted In)**

**Number of times a run scores as a result of a batter’s plate appearance, not counting situations in which an error caused the run to score or the batter hit into a double play.**

**BB (Walks)**

**Total number of walks.**

**HBP (Hit-by-pitch)**

**Number of times a batter is struck by a pitched ball without swinging at it.**

**SF (Sacrifice Flies)**

**Number of times a batter’s fly out allowed a runner to tag up and score.**

**SH (Sacrifice Bunts)**

**Any bunt in which there was a runner on base and less than two outs in which the batter was put out and at least one runner advanced.**

**TB (Total Bases)**

**The number of bases a player has gained with hits. It is a weighted sum for which the weight value is 1 for a single, 2 for a double, 3 for a triple and 4 for a home run. Only bases attained from hits count toward this total.**

**SB (Stolen Bases)**

**Number of stolen bases.**

**CS (Caught Stealing)**

**Number of times caught stealing.**

**SO (Strikeouts)**

**Number of strikeouts.**

**GDP (Grounded into Double Play)**

**Number of times the batter hit into a double play.**

****AVG (Batting Average)****

****Rate of hits per at bat, calculated as****

****AVG = H/AB.****

****SLG% (Slugging Percentage)****

****Average number of total bases per at bat.****

****SLG = TB/AB.****

**OBP (On Base Percentage) Rate at which the batter reaches base.**

**OBP = (H + BB + HBP)/(AB + BB + HBP + SF).**

**OPS (On Base Plus Slugging)**

**Combination of OBP and SLG.**

**OPS = OBP + SLG.**

**BB/K (Walk to Strikeout Rate)**

**Ratio of walks to strikeouts.**

**BB/K = Walks/Strikeouts.**

**wOBA (Weighted On Base Average)**

**Combines all the different aspects of hitting into one metric, weighting each of them in proportion to their actual run value. While batting average, on-base percentage, and slugging percentage fall short in accuracy and scope, wOBA measures and captures offensive value more accurately and comprehensively.**

**WOBA =**

**(0.69 \* uBB**

**+ 0.72 \* HBP**

**+ 0.89 \* 1B**

**+ 1.27 \* 2B**

**+ 1.62 \* 3B**

**+ 2.10 \* HR)**

**------------------------**

**AB + BB – IBB + SF + HBP**

**(\*\*) IBB are not recorded at this moment, assuming BB only.**

**ISO (Isolated Power)**

**Measure of a hitter’s raw power and tells you how often a player hits for extra bases. Around .140 is league average and hitters in the .200+ range are typically the premier sluggers.**

**ISO = SLG – AVG.**

**GPA (Gross Production Average)**

**GPA attempts to solve two frequently cited problems with OPS. First, OPS gives equal weight to its two components,** [**on-base percentage**](https://en.wikipedia.org/wiki/On-base_percentage) **(OBP) and** [**slugging percentage**](https://en.wikipedia.org/wiki/Slugging_percentage) **(SLG). In fact, OBP contributes significantly more to scoring runs than SLG does.** [**Sabermetricians**](https://en.wikipedia.org/wiki/Sabermetrician) **have calculated that OBP is about 80% more valuable than SLG. A second problem with OPS is that it generates numbers on a scale unfamiliar to most baseball fans. For all the problems with a traditional stat like** [**batting average**](https://en.wikipedia.org/wiki/Batting_average_(baseball)) **(AVG), baseball fans immediately know that a player batting .365 is significantly better than average, while a player batting .167 is significantly below average. But many fans do not immediately know how good a player with a 1.013 OPS is.**

**GPA = ((1.8 \* OBP) + SLG) / 4**

**BABIP (Batting Average on Balls in Play)**

**Measures how often non-home runs batted balls (called “balls in play”) fall for hits. BABIP is important because the frequency with which a player gets a hit on a ball in play or allows a hit on a ball in play is very telling. Three main factors influence BABIP and all three of those factors tell us something important about that player’s overall stat line. Those factors are defense, luck, and talent level.**

**BABIP = (H – HR) / (AB – K - HR + SF)**

**PA/SO (Plate Appearances per Strikeout)**

**In baseball statistics, plate appearances per strikeout (PA/SO) represents a ratio of the number of times a batter strikes out to their plate appearance.**

**Allows a defensive team to examine the opposing team's lineup for hitters who are more prone to strikeout. Such players, when batting, are typically more aggressive than the average hitter. This knowledge permits the pitcher to approach the batter with more pitching options, often throwing more balls out of the strike zone in the hope that the batter will swing and miss.**

**The number of this statistic can be calculated by dividing a player's total number of plate appearances by their total number of strikeouts. For example, Reggie Jackson collected 2,597 strikeouts and 11,418 plate appearances in his 21-year baseball career, recording a 4.39 PA/SO, which suggests that for every 4.39 plate appearance Jackson had one strikeout.**

**PA/SO = PA / SO**

**AB/HR (At Bats per Home Runs)**

**In** [**baseball statistics**](https://en.wikipedia.org/wiki/Baseball_statistics)**, at bats per home run (AB/HR) is a way to measure how frequently a batter hits a** [**home run**](https://en.wikipedia.org/wiki/Home_run)**. It is determined by dividing the number of** [**at bats**](https://en.wikipedia.org/wiki/At_bats) **by the number of** [**home runs**](https://en.wikipedia.org/wiki/Home_runs) **hit.**

**AB/HR = AB / HR**

**HR/H (Home Runs per Hit)**

**In** [**baseball statistics**](https://en.wikipedia.org/wiki/Baseball_statistics)**, home run per hit (HR/H) is the** [**percentage**](https://en.wikipedia.org/wiki/Percentage) **of** [**hits**](https://en.wikipedia.org/wiki/Hit_(baseball)) **that are** [**home runs**](https://en.wikipedia.org/wiki/Home_run)**. It is loosely related to** [**isolated power**](https://en.wikipedia.org/wiki/Isolated_power)**, which is the ability to hit for** [**extra-base hits**](https://en.wikipedia.org/wiki/Extra-base_hit)**, including home runs.** [**Power hitters**](https://en.wikipedia.org/wiki/Power_hitter)**, players who readily hit many home runs tend to have higher HR/H than** [**contact hitters**](https://en.wikipedia.org/wiki/Contact_hitter)**. A player hitting 30 home runs and have 150 hits in a season would have HR/H of .200, while a player who hit 8 home runs and have 200 hits in a season would have H/HR of .040.**

**HR/H = HR / H**

**RC (Runs Created)**

**Estimate the number of runs a hitter contributes to their team.**

**From Bill Jame’s book:**

**“With regard to an offensive player, the first key question is how many *runs* have resulted from what he has done with the bat and on the basepaths.** [**Willie McCovey**](https://en.wikipedia.org/wiki/Willie_McCovey) **hit .270 in his career, with 353 doubles, 46 triples, 521 home runs and 1,345 walks -- but his job was not to hit doubles, nor to hit singles, nor to hit triples, nor to draw walks or even hit home runs, but rather to put runs on the scoreboard. How many runs resulted from all of these things?****”**

**RC = OBP \* TB**

**or**

**RC = OBP \* SLG \* AB**

**SB% (Stolen Base percentage)**

**A player's** [**stolen base**](https://en.wikipedia.org/wiki/Stolen_base) **percentage (a.k.a. SB%) measures his rate of success in stealing bases. Because stolen bases tend to help a team less than times caught stealing hurt, a player needs to have a high stolen base percentage in order to contribute much value to his team. A commonly used figure is that a player needs to succeed about 2/3 of the time to break even.**

**SB% = SB / (SB + CS)**

**SBR (Stolen Base Runs)**

**This Total Baseball statistic is aimed at quantifying base-stealing. Numerous statistical studies done by Total Baseball have shown that the break even success rate for steals (the rate at which an attempt to steal is neither helping nor hurting the team in terms of total runs scored) is about 67%. Each successful steal adds approximately .3 runs to a team's total runs scored which is much less than often believed. Therefore, the statistic is meant to estimate the impact of base-stealers, which, other than the elite base-stealers, rarely amounts to more than a few runs per year for each team.**

**Whenever the number of stolen bases is twice the number of caught stealing, the SBR will be zero, the breaking even point. So long as SB is more than twice CS, this figure will be positive.**

**SBR = (0.3 \* SB) – (0.6 \* CS)**

**Pitching Stats**

**R (Runs Allowed)**

**Number of runs allowed by the pitcher.**

**ER (Earned Runs Allowed)**

**Number of earned runs allowed by the pitcher, determined by the official scorer. If no errors and no passed balls occur during the inning, all runs scored are automatically earned (assigned responsible to the pitcher(s) who allowed each runner to reach base).**

**IP (Innings Pitched)**

**Number of** [**innings**](https://en.wikipedia.org/wiki/Inning) **a** [**pitcher**](https://en.wikipedia.org/wiki/Pitcher) **has completed, measured by the number of** [**batters**](https://en.wikipedia.org/wiki/Batter_(baseball)) **and** [**baserunners**](https://en.wikipedia.org/wiki/Baserunner) **that have been put out while the pitcher is on the [pitching mound](https://en.wikipedia.org/wiki/Baseball_field" \l "Pitcher's_mound) in a game. Three outs made is equal to one inning pitched. One out counts as one-third of an inning, and two outs as two-thirds of an inning. The statistic is written 34.1, 72.2, or 91.0, for example, to represent 34+1⁄3 innings, 72+2⁄3 innings, and 91 innings exactly, respectively.**

**K (Strikeouts)**

**Number of strikeouts.**

**BB (Walks)**

**Number of walks allowed by the pitcher.**

**W/L (Wins and Losses)**

**Number of wins and losses.**

**SV (Saves)**

**Number of games where the relief pitcher enters a game led by the pitcher's team, finishes the game without surrendering the lead, is not the winning pitcher, and either (a) the lead was three runs or fewer when the pitcher entered the game; (b) the potential tying run was on base, at bat, or on deck; or (c) the pitcher pitched three or more innings.**

**GO (Ground outs)**

**Number of ground out balls.**

**FO (Fly outs)**

**Number of fly out balls.**

**BF (Batters Faced)**

**The number of batters a pitcher has faced, akin to plate appearances.**

**BK (Balks)**

**Number of times pitcher commits an illegal pitching action while in contact with the pitching rubber as judged by umpire, resulting in baserunners advancing one base.**

**WP (Wild Pitches)**

**Number of times when a pitch is too high, low, or wide of home plate for the catcher to field, thereby allowing one or more runners to advance or score.**

**FIP (Fielding Independent Pitching)**

**This statistic estimates a pitcher’s run prevention independent of the performance of their defense. FIP is based on outcomes that not involve defense: K, BB, HBP and HR.While is not a complete accounting of pitchers performance, it is generally a better representation of performance than ERA. The constant is solely to bring FIP onto an ERA scale and is generally around 3.10 for MLB. Because FIP is designed so that league average ERA and league average FIP are the same, to find the constant for any year, all you need to do is the following:**

**FIP Constant = lgERA – (((13\*lgHR)+(3\*(lgBB+lgHBP))-(2\*lgK))/lgIP)**

**Ultimately, we want to use statistics that allow us to isolate the performance of the player we are attempting to analyze. ERA does a terrific job telling us how many runs were scored while the pitched was on the mound, but they do not necessarily tell us how well the pitcher performed because the number of runs a pitcher allowed is also dependent on their defense, luck, and the order in which events happened (often called sequencing).**

**Imagine two pitchers who always throw the same quality pitches to identical hitters, but one pitcher throws in front of a vastly superior defense. The pitcher with the better defense will allow fewer hits, and therefore fewer runs, but the two pitchers performed identically.**

**In one sense, using FIP is extremely easy because it’s designed to look exactly like ERA. This means that you can read and use FIP exactly like you would typically use ERA. If a pitcher has a 3.15 FIP, that’s just like saying they have a 3.15 ERA as far as making comparisons among players is concerned. You don’t have to learn a new scale to interpret a player’s FIP.**

**FIP = ((13\*HR)+(3\*(BB+HBP))-(2\*K))/IP + FIP constant**

**ERA (Earned Run Average)**

**ERA is a rudimentary metric designed to assess how well a pitcher has prevented runs in the past.**

**ERA = (Earned Runs / Innings Pitched) \* 9**

**An earned run is essentially any run that was charged to the pitcher which did not score as the result of an error by the defense.**

**ERA is popular because it seems to be answering a very important question. We want to know how many runs the pitcher gave up that were his fault, but unfortunately, despite the name, ERA does not properly answer that question. Simply put, the distinction between unearned and earned runs is not an accurate demarcation between the runs that were the pitcher’s fault and the runs that were not his fault. There are two main reasons for this.**

**First, the official scorer determines if something was an error or not and official scorers do not hand out errors consistently, meaning that the same botched play might be scored an error one day and a hit another. Second, and more importantly, bad defense occurs in forms beyond rule book errors.**

**If a fielder is chasing down a fly ball and trips right before he’s about to catch it, that is not an error in the eyes of the league and the official scorer even though it was a routine fly ball that he obviously should have caught. The defense can fail the pitcher by making an error and the defense can fail the pitcher by not making a relatively easy play. Neither is the pitcher’s fault, but only error-induced runs are stripped out of ERA.**

[**Fielding Independent Pitching (FIP)**](http://www.fangraphs.com/library/pitching/fip/)**, provides a better approach to the question ERA wants to answer.**

**Color coding**

**https://www.schemecolor.com/blowing-bubbles.php**

# **Blowing Bubbles Color Scheme**

**d091a2 POOR**

**eda097 BELOW AVERAGE**

**eeebe2 AVERAGE**

**bfdce5 ABOVE AVERAGE**

**8ec8dd GREAT**

**52a4c6 ELITE**

**dee2e6 N/A – Low PA**

***https://colorbrewer2.org/?type=sequential&scheme=YlGn&n=9***

**Positive rankings (Green)**

**9 '#ffffe5',**

**8 '#f7fcb9',**

**7 '#d9f0a3',**

**6 '#addd8e',**

**5 '#78c679',**

**4 '#41ab5d',**

**3 '#238443',**

**2 '#006837',**

**1 '#004529'**

**Negative rankings**

**9 '#ffffcc',**

**8 '#ffeda0',**

**7 '#fed976',**

**6 '#feb24c',**

**5 '#fd8d3c',**

**4 '#fc4e2a',**

**3 '#e31a1c',**

**2 '#bd0026',**

**1 '#800026'**

**['#fff7f3','#fde0dd','#fcc5c0','#fa9fb5','#f768a1','#dd3497','#ae017e','#7a0177','#49006a']**

**Font Negative rankings (3)**

**3 feb24c**

**2 fd8d3c**

**1 e31a1c**

**Pitching**

**9 '#fff7fb',**

**8 '#ece7f2',**

**7 '#d0d1e6',**

**6 '#a6bddb',**

**5 '#74a9cf',**

**4 '#3690c0',**

**3 '#0570b0',**

**2 '#045a8d',**

**1 '#023858'**

**Defense**

**8 '#f7fcfd',**

**7 '#e0ecf4',**

**6 '#bfd3e6',**

**5 '#9ebcda',**

**4 '#8c96c6',**

**3 '#8c6bb1',**

**2 '#88419d',**

**1 '#810f7c',**

**'#4d004b'**