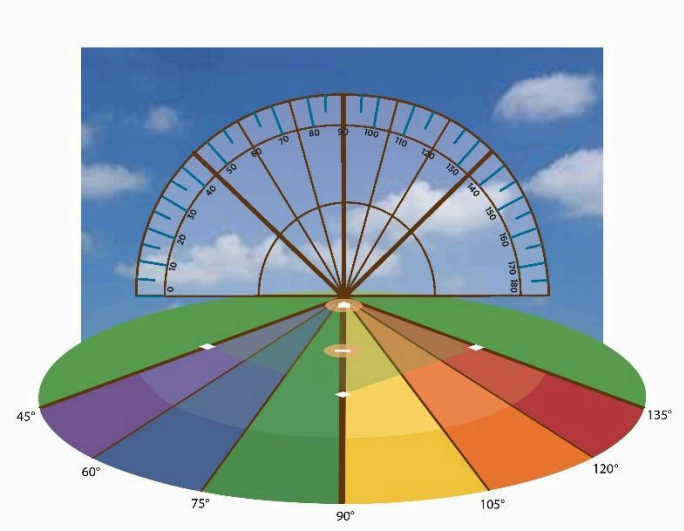
GeoBaseball: A New Angle on the Game

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In collaboration with the National Baseball Hall of Fame and Museum

Playing a game of pool. Parking a car. Designing a bridge. Reading an unmarked analog clock. In many aspects of our daily lives, we must interpret or estimate angles in order to successfully complete tasks. Unfortunately, angles have proven to be a difficult concept for students to learn (Devichi & Munier, 2013), and many grade school mathematics teachers are not able to devote sufficient time to helping students master these and other critical geometric concepts (Booth et al., in preparation). Perhaps it is not surprising, then, that misconceptions about angles persist even as students complete middle school (Biber et al., 2013) or attempt to learn high school geometry (Makhubele,2014).

We propose an exciting and innovative solution to teach about angles in a way that is flexible, inexpensive, and fun: GeoBaseball. GeoBaseball is designed to help children in upper elementary and middle school (e.g., approximately grades 4-8) learn critical geometric concepts and skills in a way that fits seamlessly into formal or informal settings in rural, suburban, or urban contexts, through a favorite national pastime.



After a carefully designed pre-lesson to introduce the fundamental concepts of angles and triangles, children will take to a modified, portable baseball field configuration (see Figure 1) that can be easily set up on any playground, parking lot, or gymnasium. Chalk, paint, or flags will be used to divide the field into segments based on angles relative to the horizontal plane at home base; if a ball were to land directly in center field it would be at an angle of 90° from that plane; a ball that lands over third base would be at an angle of 135°.

In GeoBaseball, children will learn to estimate, evaluate, and do arithmetic with angle measurements in the context of a hands-on game incorporating key elements of the sport of baseball. Children will work with teammates to strategically target particular segments of the infield or outfield to earn hits and runs while helping to their team build a collective angle score that gets closer to 360° than the opposing team by the end of the inning. In bonus innings, they

will compute the angles they need to target to construct particular types of triangles to earn additional runs for their team.

Importantly, we are working with teachers and applying the science of learning in the formation of GeoBaseball. We utilize the 3-part equation, a well-established formula for creating effective playful learning installations around the world (Pesch et al., 2022). We start by infusing the voice of stakeholders – in this case, elementary school teachers – into the design of the game. Then, we ensure the game hits each of the pillars of playful learning (ensuring that it is actively engaging, meaningful, socially interactive, iterative, and joyful for students). Finally, children will be honing important 21st century skills – called the 6Cs (*collaboration, communication, content, critical thinking creative innovation,* and *confidence*) (Golinkoff & Hirsh-Pasek, 2016). By working together as a team to play GeoBaseball, students will be practicing the skills they'll need to be successful students, employees, leaders, and citizens in the future.

May the best team win, but may all children learn to use angles to get there!