

Session 3

**Strike
Zone**

Growing Mathletes

Strike Zone

Start the session by posting and discussing this quote:

“Every day is a new opportunity. You can build on yesterday's success or put its failures behind and start over again. That's the way life is, with a new game every day, and that's the way baseball is.”

– Bob Feller

Key Ideas in this session

Youth learn how to measure their strike zone and discuss instances where professional baseball players and the youth themselves have made mistakes and learned from those mistakes.

Driving Questions:

1. How can we describe and measure a strike zone?
2. How do pitchers learn from mistakes to increase their success in throwing strikes?

Math Standards:

3.MD.7b Relate area to the operations of multiplication and addition. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Activity	Time	Description
Activity 1 How to Measure and Calculate your Strike Zone	30 minutes	You will learn how to measure your strike zone and calculate the area.
Activity 2 Throwing at your Strike Zone & Learning from Mistakes	30 minutes	You will practice throwing at your strike zone and calculate the number of balls and strikes thrown. You will also learn how mistakes provide valuable opportunities for learning.

Materials

- Tape measure (10 ft.) or Yard Stick (one per youth pair)
- Butcher Paper
- Chart paper with square grid
- Markers
- Scissors
- Masking Tape
- Foam balls (for indoor pitching) or baseballs (for outdoor pitching)
- Worksheet 1 (one copy per youth)

Set-Up

Prepare copies of Worksheets for each youth. Prepare the following materials for each pair of youth: a tape measure, markers, scissors, and butcher paper and/or chart paper with square grids.

Growth Mindset Connection

The value of mistakes in supporting learning because they provide opportunities for growth to overcome frustration.

Activity 1 - Measuring, Drawing, and Calculating the Area of our Personal Strike Zones

(30 minutes) Partners, Whole Group Discussion

Description: Youth work in pairs to measure the length and width of their strike zones, to record the dimensions on Worksheet 1, and to represent their strike zone on a sheet of butcher paper or chart paper. When the youth are finished, have them write their name in the middle of their strike zone.

STEM Connection: Rectangular figures have a length and a width. Opposite sides of a rectangle are congruent (they are the same length). We can use measurement tools, such as tape measures and rulers, to measure each dimension. The area of rectangular figures can be calculated by multiplying the length times the width. *Area = length x width.*

Connection to Prior Knowledge: Ask youth to share what they already know about Strike Zones.

- What is a strike zone? Why are strike zones important in baseball?
- Does every player have the same size strike zone?
- How is a strike zone measured?

Background Information :

- The strike zone is an invisible rectangle of unique area for each player based on their height and batting stance.
- The strike zone is the area above the hitter's knees, below the midpoint between the hitter's waist and shoulders, over the plate.
- Note: the strike zone in professional baseball is slightly different than in little league. In professional baseball the top of the strike zone is marked by the batter's chest while in little league it is marked by the arm pits.

Source: http://mlb.mlb.com/mlb/official_info/umpires/strike_zone.jsp

Instructions for how to measure your strike zone:

<https://youtu.be/OXm7vmXxj6k>

Partner Activity: Measuring Strike Zones

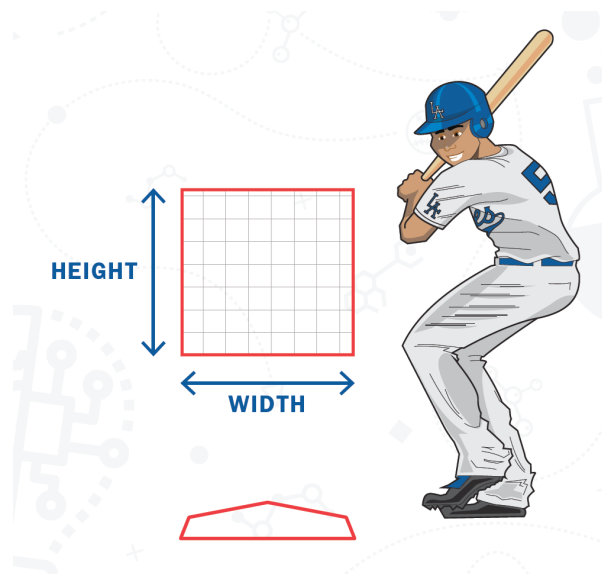
Measuring the Strike Zone: Ask youth to work with a partner to measure the length of their strike zone –which is the distance between the batter's knees and their chest (specifically the midpoint between their shoulders and waist). Model how partner A can hold one end of the tape measure at partner B's knees, while partner B extends the tape measure to their chest and reads the measurement. Next, partners work together to measure the **width of the strike zone** – which is determined by the width of home plate (17 inches). Ask youth to record the dimensions of their strike zone on **Worksheet 1**.

Activity 1 - Measuring, Drawing, and Calculating the Area of our Personal Strike Zones

(30 minutes) Partners

Drawing the Strike Zone: Ask youth to draw their own strike zone, using the measurements, on a sheet of butcher paper or chart paper (or by taping smaller pieces of paper together). Hint: if you use sheets of $8\frac{1}{2}$ " x 11" paper, taping two of them together side by side will result in 17" ($8\frac{1}{2}$ " plus $8\frac{1}{2}$ " equals 17").

Calculating the Area of the Strike Zone: Ask youth to calculate the area of their strike zone. They can use the dimensions of their strike zone, and the area formula to calculate the area ($Area = height \text{ (or length)} \times width$). If youth drew their strike zone on chart paper with a square grid, they can also count the unit squares to find the area.



Supporting STEM Concepts:

Depending on youth's prior experience with linear measurement, they can measure the dimensions of their strike zone to the nearest whole inch, the nearest half inch, or the nearest quarter inch. Support youth in using measurement tools accurately, and in checking measurements to improve precision.

Activity (Whole Group Discussion) (Grades 6-8 ONLY):

Create a group dot plot to display the area of each student's strike zone. Consider including data from facilitator strike zone (or strike zones of older players) to add additional variability in the data. The horizontal axis should be labelled in equal increments to capture the range in the data. (See **Worksheet 2**)

Activity 1 - Measuring, Drawing, and Calculating the Area of our Personal Strike Zones

Group Discussion Continued (Grades 6-8 ONLY):

- Ask students: What is the lowest value we need to represent in the dot plot? (the smallest strike zone area). What is the largest value we need to represent in the dot plot? (the largest strike zone area).
- Ask students to each record the area of their strike zone with an “x” on the dot plot. (Students place a “x” above the value on the horizontal axis that represents the area of their strike zone). Remind students that their “x” markings should all be the same size, and that one “x” should be placed above another, to form columns.
- Once all data is represented on the dot plot, as students:
 - What do you notice about the distribution of the data?
 - What is the range?
 - Where is the center of the data distribution?
 - How is the data clustered, or spread?

Reflection Questions:

Wrap up the activity with a reflective discussion about the concepts in the activity and the driving questions for the lesson.

- What did you notice about your strike zone and your partner’s strike zone? How were they similar and different?
- How can we describe and measure a strike zone? What are different strategies you and your partner tried?



Activity 2 - Throwing a Ball in the Strike Zone

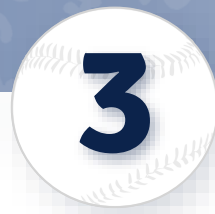
(30 minutes) - Outside Groups of 4

Description: In this activity, youth will work groups of four and practice throwing at their strike zone, which will be tape to a wall or fence. They will then calculate the number of balls and strikes thrown. Youth will also watch a video to learn how mistakes provide valuable opportunities for growth mindset to improve their skills on and off the field..

Activity: Throwing a Ball in our Strike Zone

In this activity, youth work in groups of 4 to practice pitching a ball to their strike zone.

- Provide each small group with a space on a wall or fence and ask them to tape their butcher paper/chart paper strike zone on a wall or a fence. Encourage youth to stand next to the fence/wall when they are taping their strike zone, so that they can position it correctly. The bottom of the strike zone should be at the same level as the youth's knees. The top of the strike zone should be at the same level as the youth's chest.
- Ask youth to measure a distance from the wall from which they are comfortable throwing to their strike zone. Note: the MLB distance from pitcher's mound to home plate is 60 feet, 6 inches. The Little League distance from the pitcher's mound to home plate is 46 feet. Encourage youth to begin with a shorter distance like 20 feet.
- Review 'balls' and 'strikes' with youth in relation to where the ball lands in the strike zone. Ex: ball can graze the edge of the strike zone box and it still counts as a strike. Youth then take turns to each make 10 throws. While one group member throws a ball, other group members can observe whether or not the ball is thrown inside or outside the strike zone. Count the number of strikes (inside the strike zone) and the number of balls (outside the strike zone) out of the 10 throws.



Activity 2 - The Strike Zone and Mistakes (Growth Mindset Connection)

Growth Mindset Connection:

Mistakes provide valuable opportunities for learning. When we make mistakes, in school, in sports, and in other areas of life, we can reflect on the mistake and learn from the experiences. Reflecting on mistakes can help us to adjust and improve our performance in the future.

Activity: Video and Discussion

For pitchers, it is challenging to always throw a pitch into the strike zone and they can feel frustrated at times. Since each batter has a unique strike zone, pitchers have to make continual adjustments to their pitch. When a pitcher adjusts each pitch to match the strike zone of a new batter, this is a success! In other cases, pitchers do not want to throw a ball into the strike zone, because they want to throw a “ball.” So when a pitcher hits their target it is a success, and when a pitcher misses their target it is a mistake.

Show youth a video that reflects the power of persistence and learning from mistakes.

- [Cal Ripkin Cal Ripken Jr.: 'Baseball Is A Game Of Frustration & Failure' | How I Made It | CNBC Make It.](#)

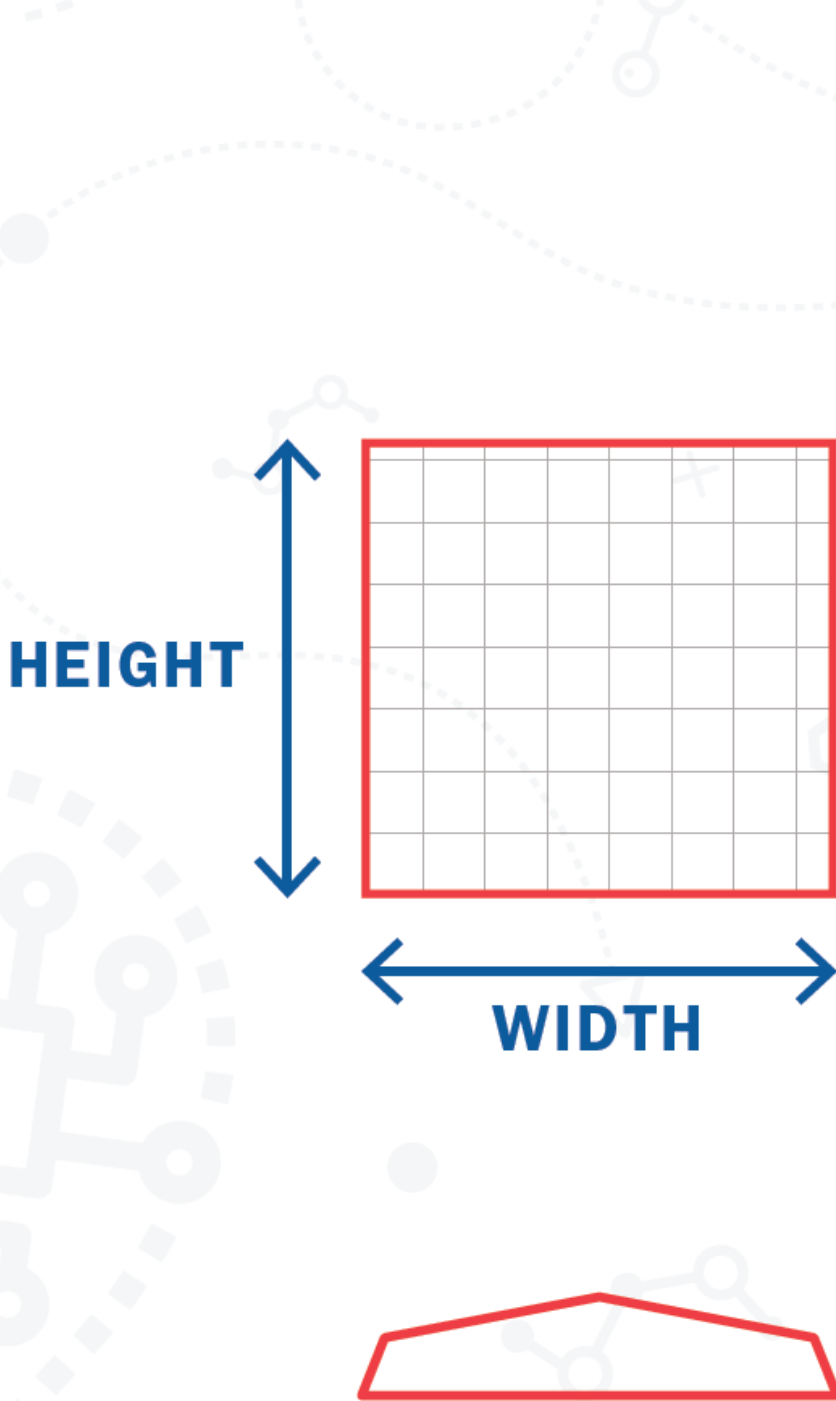
Closure Reflection Questions:

Wrap up the activity with a reflective discussion about the concepts in the activity and the driving questions for the lesson.

- Think of a time when you learned from mistakes in your own life (in sports, in school, or in everyday life) .
- What was challenging at first, but got you through it?
- Share your example with a partner.

Emphasize how we can all learn from mistakes, persist, and adjust to improve our performance over time.

Worksheet 1 - Strike Zone



Worksheet 2- Dot Plot of Strike Zone Area

Grades 6-8 ONLY

Directions: Create a group dot plot to display the area of each youth's strike zone.

