



Growing Mathletes

Sports Vision Lesson Overview

Key Ideas in This Session: Youth learn how to identify their dominant eye and dominant hand, and the importance of depth perception. Youth investigate depth perception by plotting landing points from a coin drop activity onto a coordinate plane and learn how to embrace struggles in their efforts to improve.

Driving Questions:

1. How does your dominant hand or dominant eye and your depth perception impact how you play baseball?
2. How can we record the results of a depth perception exercise on a coordinate grid using ordered pairs?

Math Standards: **5.G.1** Understand and describe a coordinate system as perpendicular number lines, called axes, that intersect at the origin (0, 0). Identify a given point in the first quadrant of the coordinate plane using an ordered pair of numbers, called coordinates. Understand that the first number (x) indicates the distance traveled on the horizontal axis, and the second number (y) indicates the distance traveled on the vertical axis.

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Activity	Time	Description
Activity 1	20 minutes	Youth will identify their dominant eye and dominant hand.
Activity 2	40 minutes	Youth will plot ordered pairs on a coordinate grid to illustrate the results of a depth perception coin drop activity. Youth will learn about the role of depth perception in sports. Youth will reflect on the role of struggle as they improve at something over time.

Materials

- Small Cups (1-2 per group)
- Coins (pennies work well)
- Blindfolds
- Large chart paper pre-printed with 1-inch grids
- Worksheet 1 (one copy per youth)

Set-Up

For **Activity 1**, use a white board or graph paper to record youth responses.

For **Activity 2**, create a coordinate grid on a large piece of graph paper that includes two perpendicular number lines, called axes, that intersect at the origin (0, 0). Set out a small cup for each group, pennies and blindfolds.


Growth Mindset: Malleability of the brain and the role of struggle in learning.

Sports Vision Introduction

Start the session by providing youth with an overview of the key activities.

Sports Vision

Activity	Time	Description
Activity 1	20 minutes	Youth will identify their dominant eye and dominant hand.
Activity 2	40 minutes	Youth will plot ordered pairs on a coordinate grid to illustrate the results of a depth perception coin drop activity. Youth will learn about the role of depth perception in sports. Youth will reflect on the role of struggle as they improve at something over time.



Sports Vision Youth Slides, Slide 1


Next, share and discuss this quote.

“You can’t always control the circumstances – only how you react to those circumstances; you can always control your attitude and your effort.”

~ Jennie Finch

Sports Vision

“You can’t always control the circumstances – only how you react to those circumstances; you can always control your attitude and your effort.”
- Jennie Finch



What does this quote mean to you?
What message is Jennie Finch trying to send?

Sports Vision Youth Slides, Slide 2

Activity 1 - Eye Dominance and Hand Dominance (1 of 3)

Description: In this activity, youth will use fractions to represent the proportion of the total group of youth that are left-eye dominant or right-eye dominant, and the proportion of the total group of youth that are left-hand dominant or right-hand dominant. In this activity the numerator of the fraction represents the portion of the group that reflects a specific characteristic (i.e., how many youth are left-eye dominant) and the denominator of the fraction represents the total number of youth.

LAUNCH: Connect to Prior Knowledge

Ask youth what they know about hand dominance.

- Do you have a dominant hand? Think about which hand you use to write, to throw a ball, or to brush your teeth.
- Do you use this hand for all activities, or do you use different hands for different activities?

Group Activity: Hand Dominance

Next, ask youth to raise their hands to indicate their dominant hand (the hand that they use to throw, or to write). Record the number of youth who are left-hand dominant and the number that are right-hand dominant.

Ask youth to write fractions to represent the portion of the group that is left-hand versus right-hand dominant.

Review the meaning of the numerator and the denominator in the fraction.

Example: in a group of 18 youth, 3/18 are left-hand dominant, 15/18 are right-hand dominant.

Introduce **tape diagrams / bar models**. Explain how they can fill in squares to represent a fraction.

Activity 1: Eye Dominance and Hand Dominance

- Do you have a dominant hand? Think about which hand you use to write, to throw a ball, or to brush your teeth.
- Do you use this hand for all activities, or do you use different hands for different activities?



Activity 1

Sports Vision Youth Slides, Slide 3

Whole Group Activity: Hand Dominance

How many people in our group are **LEFT** hand dominant (left-handed)?

Raise your **LEFT** hand!

What fraction of people are **LEFT** hand dominant?



How many people in our group are **RIGHT** hand dominant (right-handed)?

Raise your **RIGHT** hand!

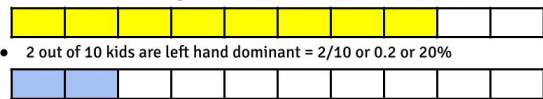
What fraction of people are **RIGHT** hand dominant?

Activity 1

Sports Vision Youth Slides, Slide 4

Demonstrate: Fractions for Hand Dominance

- 8 out of 10 kids are right hand dominant = $\frac{8}{10}$ or 0.8 or 80%
- 2 out of 10 kids are left hand dominant = $\frac{2}{10}$ or 0.2 or 20%



$$\frac{\text{numerator (number of parts we have)}}{\text{denominator (total parts in whole)}} = \frac{8}{10}$$

Activity 1

Sports Vision Youth Slides, Slide 5

Activity 1 - Eye Dominance and Hand Dominance (2 of 3)

Group Activity: Eye Dominance

Youth will determine their dominant eye (ocular dominance). This method is explained in the following clip:

VIDEO: How to Determine Your Dominant Eye with Our Dominant Eye Test

- Ask youth to make a small opening with your two hands and hold them arms-length away.
- Focus on a distant object by looking at it through the opening. Slowly move your hands towards your face.

The eye that aligns with the object is your dominant eye.

Next, ask youth to raise their hands to indicate their dominant eye. Record the number of youth who are left-eye dominant and the number that are right-eye dominant.

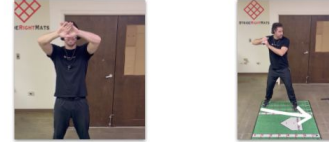
Ask youth to write fractions to represent the portion of the group that is left-eye versus right-eye dominant.

Example: in a group of 18 youth, 5/18 students are left-eye dominant, 13/18 students are right-eye dominant.

Whole Group Activity: Eye Dominance

[How to Determine Your Dominant Eye with Our Dominant Eye Test](#)

- Make small opening with your hands and hold arms stretched out
- Focus on distant object in the room
- Slowly move hands towards your face
- The eye that aligns with the object is your dominant eye!



Activity 1

Sports Vision Youth Slides, Slide 6

Whole Group Activity: Eye Dominance

How many people in our group are LEFT eye dominant?

What fraction of people are LEFT eye dominant?



How many people in our group are RIGHT eye dominant?

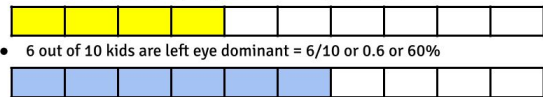
What fraction of people are RIGHT eye dominant?

Activity 1

Sports Vision Youth Slides, Slide 7

Demonstrate: Fractions for Eye Dominance

- 4 out of 10 kids are right eye dominant = $\frac{4}{10}$ or 0.4 or 40%
- 6 out of 10 kids are left eye dominant = $\frac{6}{10}$ or 0.6 or 60%



$$\frac{\text{numerator (number of parts we have)}}{\text{denominator (total parts in whole)}} = \frac{6}{10}$$

Activity 1

Sports Vision Youth Slides, Slide 8

Activity 1 - Eye Dominance and Hand Dominance (3 of 3)

Optional Videos:

Share one or both of these optional videos about the role of eye dominance and reaction time in sports.

1. Sports Science MLB Reaction Time Video:

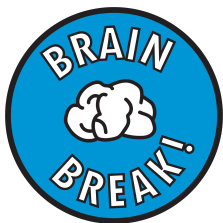
<https://youtu.be/FrZVRuK77EE>

Youth learn about reaction time in baseball

2. Baseball player discovers which of their eyes is most dominant when hitting. Watch how he corrects to create better balance and swing.

https://www.youtube.com/watch?v=pyEGBVK4Tgc&ab_channel=fotopete77

Reflection Questions:



To wrap up, discuss with youth the following:

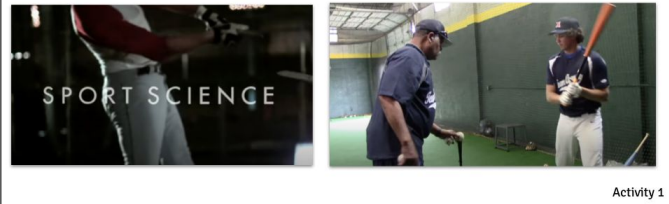
What patterns did you notice with hand and eye dominance? Did anything surprise you?

How does your dominant hand or dominant eye impact how you play baseball?

Optional Videos

[Sports Science MLB Reaction Time Video](#)

[Baseball player discovers which of their eyes is most dominant when hitting](#)



Sports Vision Youth Slides, Slide 9

- What patterns did you notice with hand and eye dominance? Did anything surprise you?
- How does your dominant hand or dominant eye impact how you play baseball?

Sports Vision Youth Slides, Slide 10

Activity 2 - Depth Perception and Hitting a Baseball (1 of 5)

Description: In this activity, youth label points on a coordinate system to show the location of a coin drop in a depth perception activity.

Math Ideas: A coordinate system includes two perpendicular number lines, called axes, that intersect at the origin (0, 0). Youth use ordered pairs to identify specific locations in the coordinate system. The first number in the ordered pair (x) indicates the distance traveled on the horizontal x -axis, and the second number in the ordered pair (y) indicates the distance traveled on the vertical y -axis. Positive numbers indicate distances traveled to the right of the origin (0, 0), or up from the origin. Negative numbers indicate distances traveled to the left of the origin, or down from the origin.

LAUNCH: Connection to Prior Knowledge

Ask youth what they know about depth perception.

- What is depth perception? (*The ability to perceive distance of objects in your visual field.*)
- When do we use depth perception in baseball?
- What might happen if we did not have depth perception? (*It would be difficult to perceive how far away objects or people are.*)

Show youth two short videos about depth perception in sports.

VIDEO 1: Sports and depth perception
https://www.youtube.com/watch?v=OmDO4pnQSdw&ab_channel=Dr.PatriciaFinkOptometry - show from 0:00 - 0:59



VIDEO 2: The importance of depth perception in hitting a baseball
https://www.youtube.com/shorts/EjaCgN8_pdQ

When finished, discuss the following questions:

- How does good depth perception help batters hit the ball?
- Do you think covering one eye impacts your depth perception? (*We need two eyes in the front of our head to have depth perception; covering one eye removes our depth perception.*)

Activity 2: Depth Perception and Hitting a Baseball

- What is depth perception?
- When do we use depth perception in baseball?
- What might happen if we did not have depth perception?


Activity 2

Sports Vision Youth Slides, Slide 11


Videos about depth perception:

- How does good depth perception help batters hit the ball?
- Do you think covering one eye impacts your depth perception?

[The importance of depth perception in hitting a baseball](#)



[Sports and Depth Perception](#) (stop at 0:59)



Activity 2

Sports Vision Youth Slides, Slide 12

Activity 2 - Depth Perception and Hitting a Baseball (2 of 5)

Team Activity Set Up: Setting Up Your Team's Grid

Before beginning the activity, tell youth they will be dropping objects and marking the location where they fall on the coordinate grid.

Give each group one large sheet of chart paper that is pre-printed with a one-inch grid. Ask youth to work with their groups to set up their team grid, using the directions on Slide 13.

Team Activity: Setting Up Your Team Grid

Directions for setting up your team's coordinate grid.

- Draw a vertical axis (blue line) and a horizontal axis (red line) on your team's graph paper.
- Number each of the two axes from -10 to +10.
- Place the graph paper on the table
- Place an empty cup on the graph paper at the origin (0, 0).
- The goal of this activity is to drop a coin into the empty cup!

Your grid should look like this!

Activity 2

Sports Vision Youth Slides, Slide 13

- Draw a vertical axis (blue line) and a horizontal axis (red line) on your team's graph paper.
- Number each of the two axes from -10 to +10.
- Place the graph paper on the table
- Place an empty cup on the graph paper at the origin (0, 0).
- The goal of this activity is to drop a coin into the empty cup!

Supporting Math Concepts: How to Label Points on a Coordinate Grid

Next, remind youth that a coordinate grid has four quadrants with two perpendicular lines called axes.

- The x-axis is the horizontal axis and the y-axis is the vertical axis.
- An additional way to help youth identify each axis is to remind them that the horizontal axis is sideways like the horizon, while the vertical axis is up-and-down.
- Quadrant I has ordered pairs (+x, +y), Quadrant II has ordered pairs (-x, +y), Quadrant III has ordered pairs (-x, -y), and Quadrant IV has ordered pairs (+x, -y).

Practice labelling several points on the coordinate grid, using the examples such as those shown on Slide 14.

Distribute one copy of **Worksheet 1** to each youth - this is the recording sheet for the activity.

How to Label Points on the Coordinate Grid

- Points on the graph are (x, y)
- Quadrant I has (+x, +y)
- Quadrant II has (-x, +y)
- Quadrant III has (-x, -y)
- Quadrant IV has (+x, -y)

In which Quadrant is the point:

- (4, 2)?
- (2, -2)?
- (-3, 1)?

Activity 2

Sports Vision Youth Slides, Slide 14

Sports Vision

Worksheet 1 - Sports Vision

Coin Dropper Name	1st Drop	2nd Drop	3rd Drop	4th Drop	5th Drop

12

Worksheet 1

Activity 2 - Depth Perception and Hitting a Baseball (3 of 5)

Activity

Instructions:

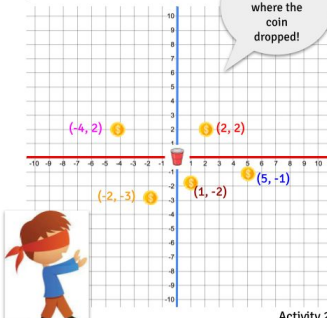
The goal of this activity is to drop a coin into the empty cup.

In teams of three or four, youth will rotate roles (see Slide 15):

- The **Coin Dropper** will be blindfolded and will hold the coin straight out in front of them (90 degree angle from their chest) so that their hand is at least one foot from the team grid paper. **Remind youth that arms must stay at a 90 degree angle from their body, parallel to the floor.**
- The **Director** will cover one eye and give instructions to the blindfolded Coin Dropper, directing the youth to position their arms and hand to drop the coin inside the cup. The Director covers one eye because this limits their depth perception, making it harder for them to give clear instructions to drop the coin in the cup.
- The **Recorder** will **mark the location of each coin drop on the team grid, labelling the point.** For example, the sample grid below shows coins dropped at (2, 2), (0, 0), (-4, 2), (1, -2), (-2, -3) and (5,1), Next, the Recorder will **record ordered pairs to show the location of each drop in the table on Worksheet 1** (see Slide 16).
- Youth will rotate roles, along with the recording sheet, so that each youth has the opportunity to drop the coin, to direct, and to record the results on the recording sheet. Each youth should have the opportunity to drop the coin at least 3 times.
- When finished, youth can copy results on to their individual recording sheet.

Activity Instructions: Depth Perception Coin Drop

- **Coin Dropper:** While blindfolded, hold the coin straight out in front so that your hand is at least 1 foot away from the paper.
- **Director:** Cover one eye. Give instructions to the **Coin Dropper**, directing them to move their arms so they drop the coin inside the cup.
- **Recorder:** Mark where the coin landed on the graph paper and label the closest point.
- Record points on **Worksheet 1**.
- Repeat so that the **Coin Dropper** drops the coin 5 times.
- Switch roles so each group member drops the coin 5 times.



Activity 2

Sports Vision Youth Slides, Slide 15

Team Activity: Depth Perception Coin Drop

Worksheet 1

- Record each group members name in the table.
- After the **Coin Dropper** drops a coin, the **Recorder** will mark the point where each coin landed on the team grid, and record the point in the table.
- After a **Coin Dropper** drops 5 coins, rotate roles.
- **Record** where the new **Coin Dropper** drops coins in a new row of the table.

Coin Dropper Name	1st Drop	2nd Drop	3rd Drop	4th Drop	5th Drop
Sarah	(1, 5)	(2, -3)	(0, -5)	(-6, 7)	(-2, -3)
Julio					
Kyle					
Marta					

Activity 2

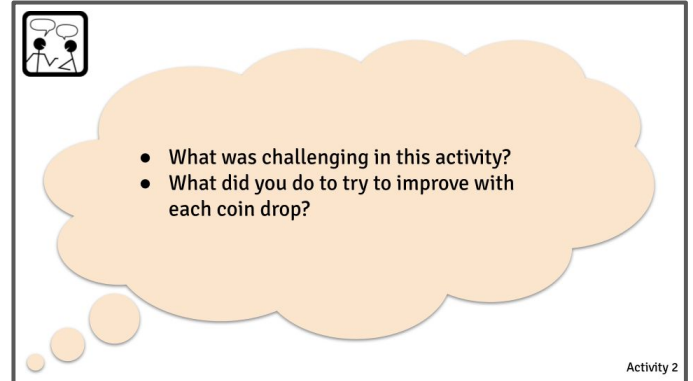
Sports Vision Youth Slides, Slide 16

Activity 2 - Depth Perception and Hitting a Baseball (4 of 5)

Whole Group Discussion:

After all teams complete the activity, ask youth to share observations and results.

- What was challenging in this activity?
- What did you do to try to improve with each coin drop?



Activity 2

Sports Vision Youth Slides, Slide 17

Demonstrate: Embrace the Struggle

Next, discuss how baseball players face challenges and embrace struggles at various points during their lives and baseball careers.

Start with Billy Wagner, a long time MLB relief pitcher/closer. He broke his right arm twice before the age of 7 and ended up pitching over 100 mph with his left arm as a professional MLB player.

- In the following video clip, Billy Wagner discusses how even though he broke his right arm twice, he wanted to play baseball so much that he just starting pitching with his left hand. Quote - 'If I was right handed, I would not be here today' [as an MLB player being interviewed].
- Video about Billy Wagner:
<https://www.mlb.com/video/billy-wagner-on-hof-chances-x9035> Play from 5:05 - 6:25
- Why did Wagner start pitching with his non-dominant hand?
- What do you think about Billy Wagner's persistence to get into the Baseball Hall of Fame?

Embrace the Struggle in Learning

Billy Wagner broke his right arm twice by age 7
He pitched left-handed, still played in the Majors, and was one of the best relief pitchers ever!

VIDEO: [Billy Wagner on HOF Chances](https://www.mlb.com/video/billy-wagner-on-hof-chances-x9035)

Activity 2

Sports Vision Youth Slides, Slide 18

Activity 2 - Depth Perception and Hitting a Baseball (5 of 5)

Demonstrate: Embrace the Struggle (Cont.)


Next, present the video about Pat Venditte who was an ambidextrous MLB pitcher, meaning he can throw with both arms. Pat Venditte started throwing with both arms at the age of 3 and utilized the growth mindset concept of malleability of the brain and the role of struggle in learning to make it to the Majors with the ability to throw with both arms.

- In the following video clip, Venditte makes his debut along with an explanation of the Venditte rule.
- Video about Pat Venditte:
https://www.youtube.com/watch?v=ZzTzh45RgaQ&ab_channel=MLB (0:00 - 3:00)
- How did patience and persistence help Pat Venditte improve as a baseball player?

Embrace the Struggle in Learning

VIDEO: [Switch-pitcher Venditte makes his MLB debut](https://www.youtube.com/watch?v=ZzTzh45RgaQ&ab_channel=MLB) (stop at around 3 minutes)

- What does “ambidextrous” mean?
- Pat Venditte started throwing both right-handed and left-handed at age 3.
- Persistence and patience to improve helped him make it to the MLB.



How did patience and persistence help Pat Venditte improve as a baseball player?


Activity 2

Sports Vision Youth Slides, Slide 19

Reflection Questions:

To conclude this activity, prompt youth to think about growth mindset, persistence, and effort. Ask them the following questions:

- What is something that you have improved over time?
- How did you “embrace the struggle” as you were trying to improve?



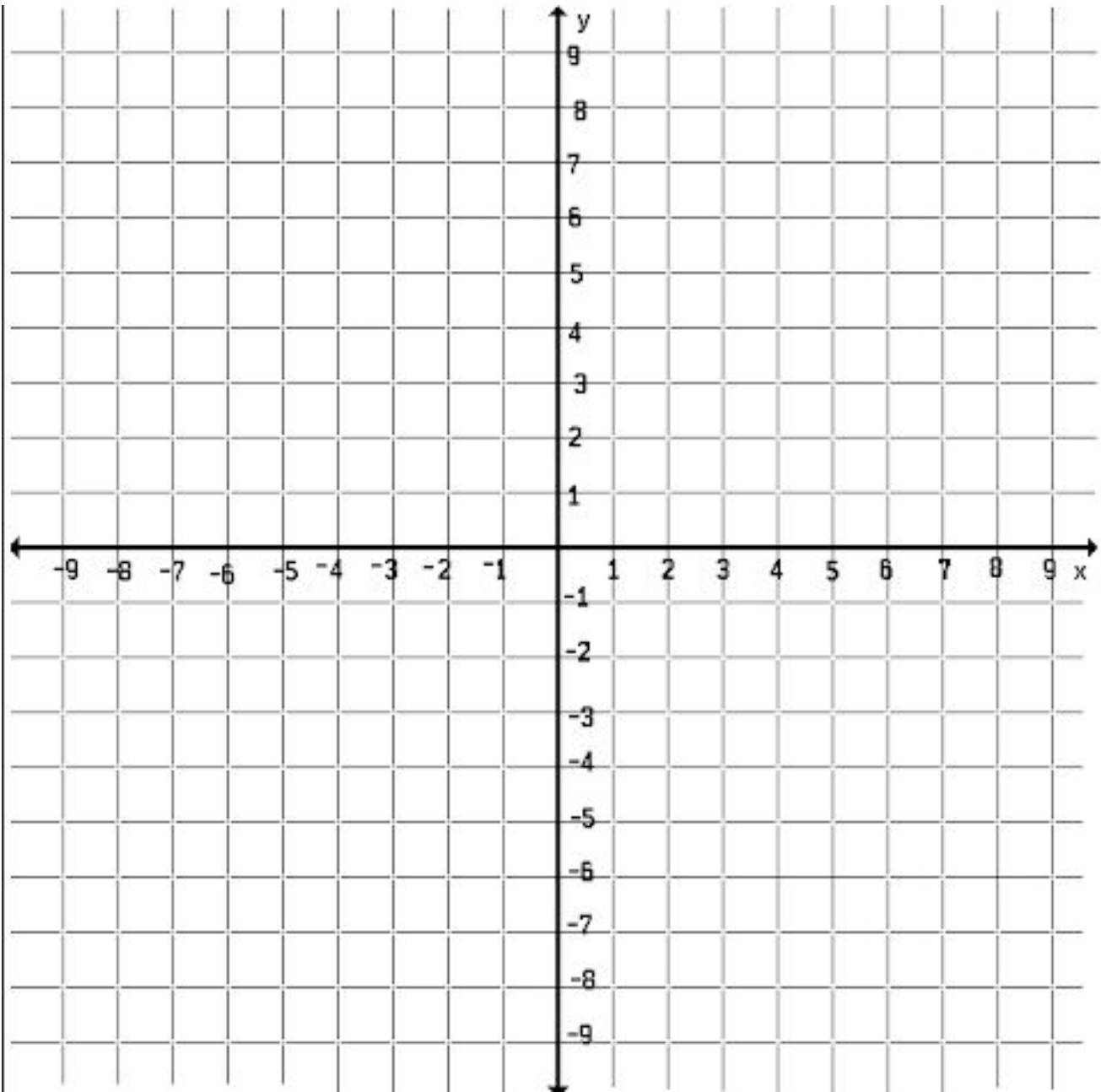
What is something that you have improved over time?

How did you “embrace the struggle” as you were trying to improve?

Activity 2

Sports Vision Youth Slides, Slide 20

Worksheet 1 - Sports Vision



Coin Dropper Name	1st Drop	2nd Drop	3rd Drop	4th Drop	5th Drop