

Name: \_\_\_\_\_

Class: \_\_\_\_\_

# Probability and Penalty Kicks

GRADES 6-8

## Data Collection

	Shots Made	Total Kicks	Probability (calculated)
Partner 1: Right Foot			
Partner 2: Right Foot			
Partner 1: Left Foot			
Partner 2: Left Foot			

Based on your dominant foot probability	Predicted Outcome	Actual Outcome	Error (absolute value of actual subtracted from predicted)
12 Kicks			
15 Kicks			
100 Kicks			
1,000 Kicks			
2,000 Kicks			

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# Probability and Penalty Kicks

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Explain how probability can be a helpful tool to make predictions.

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Explain how probability can have limitations in predictions.

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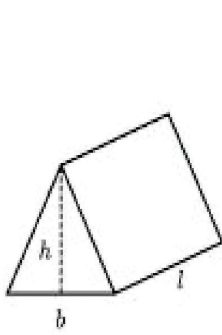
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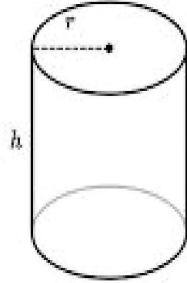
# Properties and Behavior of Footballs

GRADES 6-8

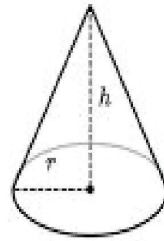
Formulas:



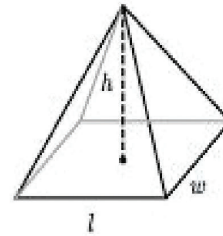
$$V = \frac{b \cdot h \cdot l}{2}$$



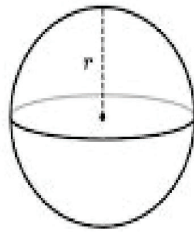
$$V = \pi r^2 h$$



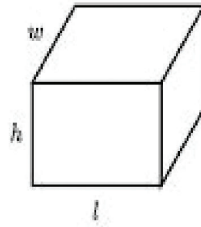
$$V = \frac{\pi r^2 h}{3}$$



$$V = \frac{l \cdot w \cdot h}{3}$$



$$V = \frac{4}{3} \pi r^3$$



$$V = l \cdot w \cdot h$$

<p>Volume of object 1:</p>	<p>Volume of object 2:</p>
<p>Volume of object 3:</p>	<p>Volume of object 4:</p>

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# Properties and Behavior of Footballs

GRADES 6-8

	Volume of the center cylinder	Volume of the end cone	Approximate volume of the football	Mass of the football	Density of the football D=M/V
Youth Football	_____ +	(_____) x2	=		
Foam Football	_____ +	(_____) x2	=		

**Claim:** How does the density of a football affect its behavior? Use evidence to support your answer.

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# Advancements in Shoe Technology

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Shoe	Observations with numbers	Observations with words	Inference about why there was a design change
			
			
			
			
			

1. What would you consider the single greatest advancement in basketball shoe technology in the last 100 years? Please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. Hypothesize why basketball shoes have changed more in the last 45 years (1972 – present) than they did the previous 60+ years (1910 to 1972). \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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# Advancements in Shoe Technology

GRADES 6-8

3. Do you think high-top shoes reduce ankle injuries compared to low-top shoes? Please explain.

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4. For many athletes, Converse Chuck Taylor sneakers lasted an entire season, if not more. Now most players change their shoes every week, if not every day. Please explain. \_\_\_\_\_

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Brainstorm three designs that improve shoe technology to increase performance and decrease injury.

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Select your best design: Use your observations and inferences from the shoe advancement data table to justify why your design will increase performance and decrease injury.

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# Adaptive Technology

GRADES 6-8

Create a device that will help adaptive players retrieve the ball after a play. Brainstorm ways to help adaptive players.

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# Adaptive Technology

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Select a Design (draw in detail, label materials and provide measurements)

Prototype testing plan:

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# Heart Rate and Calories

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	Partner 1	Partner 2
Resting heart rate (measured)		
Heart rate after 2.5 minutes of play		
Heart rate after 5 minutes of play		
Maximum heart rate (calculated)		

Using the equation  $C = (\text{MET} \times \text{weight}) \times t$ , complete the data table and graph.

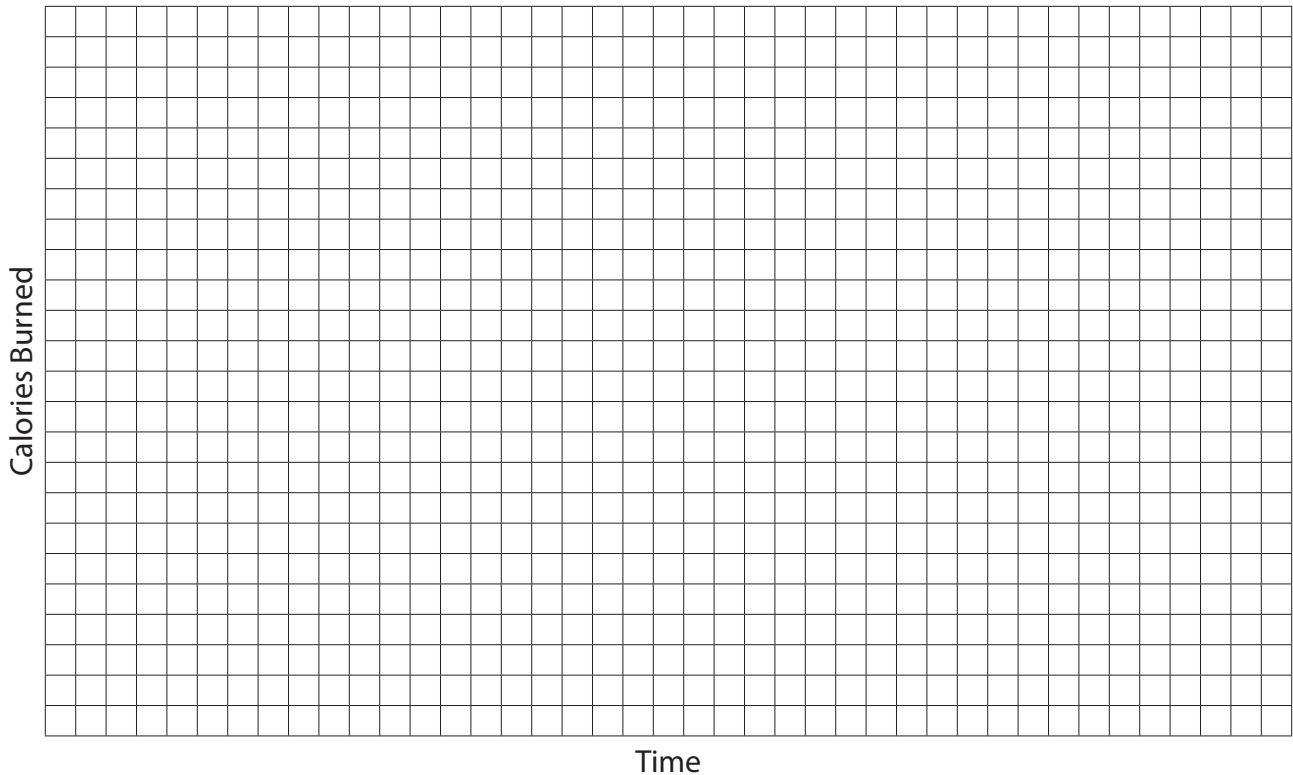
Time of Activity (hours) t	@ Resting Heart Rate (MET 1.5)	@ Heart Rate for Playing Soccer (MET 8.5)
0		
1		
2		
3		
4		
5		
6		

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# Heart Rate and Calories

GRADES 6-8



### Using the graph:

1. How many calories did you burn when you played soccer for 5 minutes? \_\_\_\_\_

2. If you played soccer for 45 minutes, how many calories would you burn? \_\_\_\_\_

3. If you played soccer for 90 minutes, how many calories would you burn? \_\_\_\_\_

4. How did your calculations compare to those provided by the heart rate monitor?

\_\_\_\_\_

\_\_\_\_\_








5. How does the MET value change the slope of the line?

\_\_\_\_\_

\_\_\_\_\_

# The Evolution of the Football Helmet

GRADES 6-8

<p>No Helmet</p>	<p>Helmet 1</p> 
<p>Helmet 2</p> 	<p>Helmet 3</p> 
<p>Helmet 4</p> 	<p>Helmet 5</p> 
<p>Helmet 6</p> 	<p>Helmet 7</p> 

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# The Evolution of the Football Helmet

GRADES 6-8

Helmet	Observations	Advantages	Limitations	Prediction: Percent of concussions
No Helmet				
H1				
H2				
H3				
H4				
H5				
H6				
H7				

# Shot Tracking with Technology

GRADES 6-8

## Probabilities of Success

	Self	Partner 1	Partner 2	Partner 3
FT				
2PT				
3PT				

Calculate your frequency of success for the following:

1. If you attempted 27 – 3PT shots: \_\_\_\_\_
2. If you attempted 93 – 2PT shots: \_\_\_\_\_
3. If you attempted 21 – FT shots: \_\_\_\_\_

Based on the graph you constructed with your class data, and your frequency and probability above, make a claim that expresses who would be the highest paid player on your class' team. Support your claim with evidence and reasoning.

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Name: \_\_\_\_\_

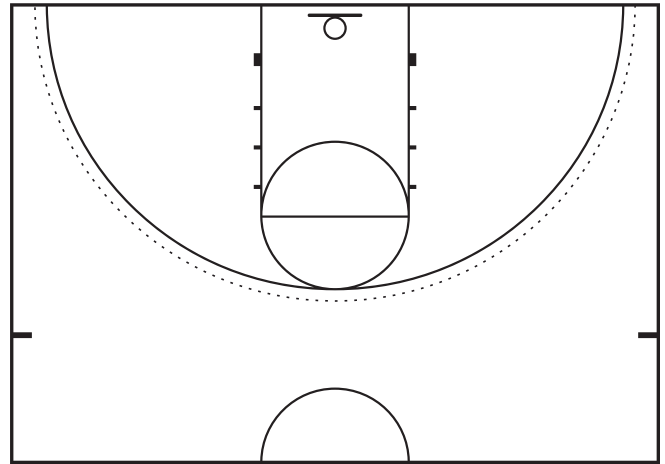
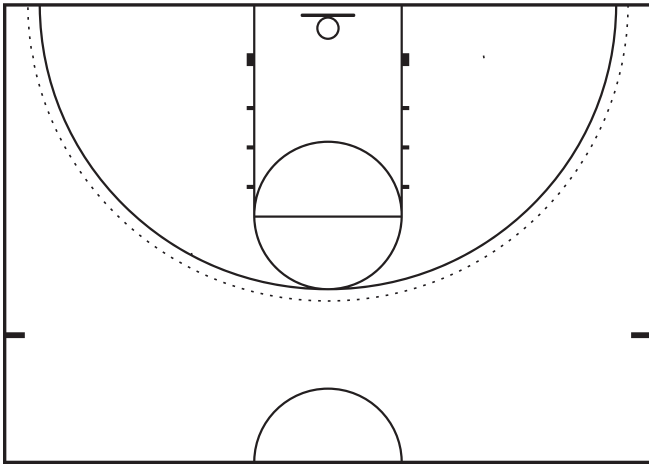
Class: \_\_\_\_\_

# Shot Tracking (Non-Technology Option)

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O - Shots Made

X - Shots Missed



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL Made
Free Throws																
Lay-Ups																

Write a mathematical expression that states if your free throw accuracy is greater than or less than your layup accuracy. Justify it with evidence.

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