Name: _____   **Class:** _____

Intricacies of a Volleyball Court
GRADES 6-8

Try calculating the following to determine the width of a scaled down court.

1. $$\frac{0.25 \text{ inch } (¼)}{1 \text{ foot}} = \frac{x \text{ inches}}{29.6 \text{ feet}}$$

2. $$\frac{0.5 \text{ inch } (½)}{1 \text{ foot}} = \frac{x \text{ inches}}{29.6 \text{ feet}}$$

3. $$\frac{0.125 \text{ inch } (⅛)}{1 \text{ foot}} = \frac{x \text{ inches}}{29.6 \text{ feet}}$$

Which of the three scales would have a reasonable end width? Why?

Name: _____   **Class:** _____

Intricacies of a Volleyball Court
GRADES 6-8

Try calculating the following to determine the length of a scaled down court.

1. $\dfrac{0.25 \text{ inch (¼)}}{1 \text{ yard}} = \dfrac{x \text{ inches}}{59 \text{ feet}}$

2. $\dfrac{0.5 \text{ inch (½)}}{1 \text{ yard}} = \dfrac{x \text{ inches}}{59 \text{ feet}}$

3. $\dfrac{0.125 \text{ inch (⅛)}}{1 \text{ yard}} = \dfrac{x \text{ inches}}{59 \text{ feet}}$

Which of the three scales would have a reasonable end length? Why?

Coaches have clipboards that are 8.5 x 11 inches. What scale would you use to ensure the court fits on a single sheet of paper?

Name: _____ **Class:** _____

Communication and Drills
GRADES 6-8

Video Title: _____

Written instructions for your partner:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____ **Class:** _____

Communication and Drills
GRADES 6-8

1. After watching the video, how well did you perform the drill on a scale of 1 to 5?

   Poor   **Just like the video**

   1   **2**   **3**   **4**   **5**

   Justify:

   _____

   _____

   _____

2. After watching the video, how would you rate your partner's written instructions on a scale of 1 to 5?

   Poor   **Just like the video**

   1   **2**   **3**   **4**   **5**

   Justify:

   _____

   _____

   _____

3. What descriptive words could your partner have used that would have made the drill easier to understand? Add to his/her written instructions in blue.

4. What edits would you make to your partner's written instruction? Add any changes in green.

Name: _____ Class: _____

Volleyball Properties

GRADES 6-8

Volleyball	Observations on the Properties: Material, Texture, Bounceability
First Touch Volleyball	
Light Touch Volleyball	
Recreation Volleyball	
Balloon	

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Name: _____   **Class:** _____

Volleyball Properties
GRADES 6-8

Volleyball	Performance (Bump Test) Distance (Ft)	Mass (grams)	Volume $V=4/3\pi r3$ (in^3)	Density (mass/volume) g/in^3
First Touch Volleyball				
Light Touch Volleyball				
Recreation Volleyball				
Balloon				

How does density affect performance? (Support your answer with evidence)

_____

_____

_____

_____

Name: _____   Class: _____

Calculating Total Force
GRADES 6-8

What variables do you need to control?

_____

_____

_____

_____

	Speed (measured by radar)	Time of travel (From video)	Acceleration (Calculated $(S_I - S_F)$/time)	Mass	Force F=MA
Initial Serve					
Easy Serve					
Hard Serve					

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Name: _____   **Class:** _____

Calculating Total Force

GRADES 6-8

How does a change in force affect a change in motion? Support your answer with evidence from the experiment.

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____   **Class:** _____

Kinetic Energy and Speed
GRADES 6-8

Hit Type	Trial 1	Trial 2	Trial 3	Average Velocity	Mass	Kinetic Energy (Calculated) $K = \frac{1}{2} MV^2$
Set						
Serve (Underhand)						
Serve (Torque)						
Serve (Overhead)						
Bump						

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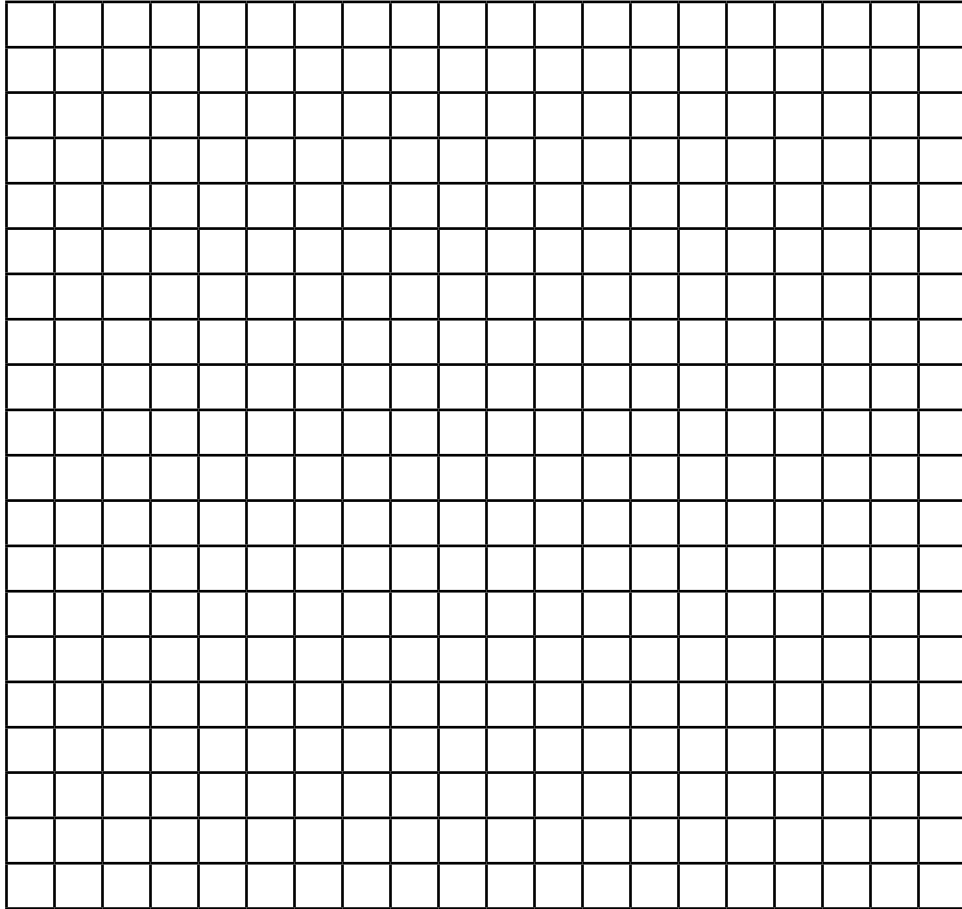engineering • math • sports

Name: _____   **Class:** _____

Kinetic Energy and Speed
GRADES 6-8

Graph the Kinetic Energy of each hit:

Why do some hits in volleyball have more kinetic energy than others? (Support your claim with evidence and reasoning).

_____

_____

_____

_____

_____

_____

Name: _____   **Class:** _____

Successful Serving
GRADES 6-8

Place an X when the serve is completed (hits the wall).
Order of balls should be: First, Light, Recreation

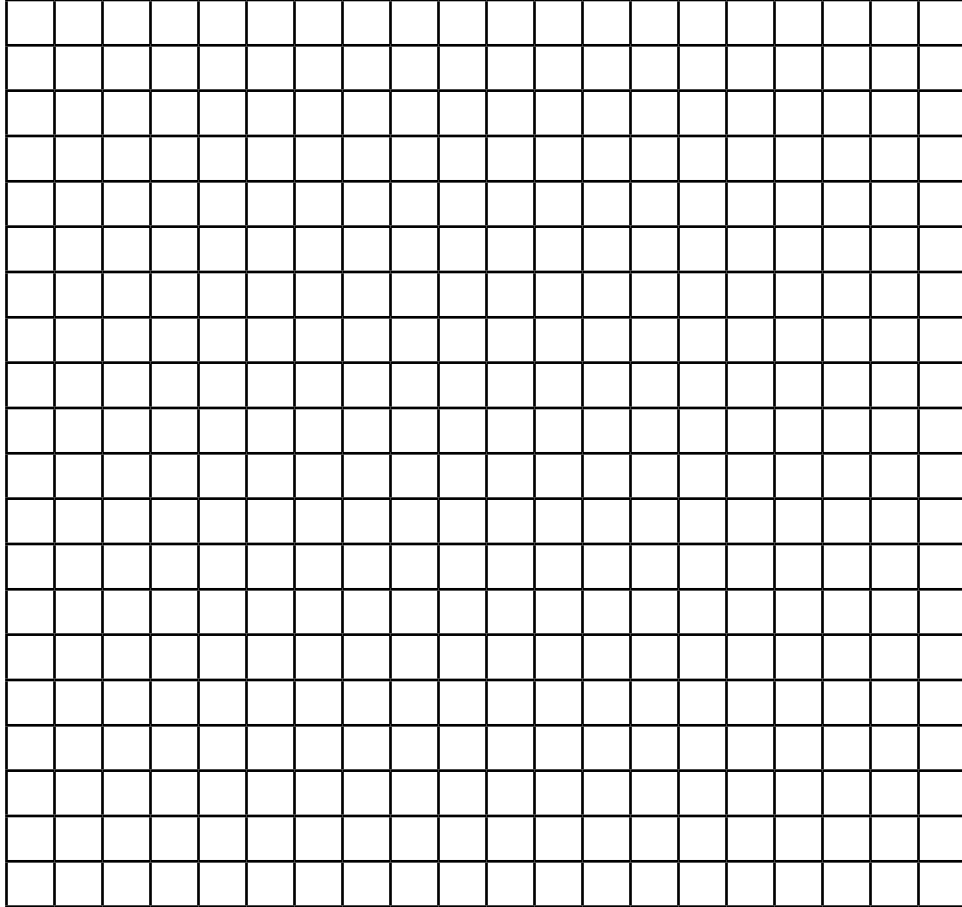| Serve	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Probability
Underhand Serve											
Torque Serve											
Overhead Serve											

Name: _____   **Class:** _____

Successful Serving

GRADES 6-8

Graph the probability of each serve below:

Which serve is more likely to be successful in a match? Support your answer with data.

_____

_____

In an average volleyball game, there is between 125 - 250+ serves. Calculate the success rate of each serve and select which serve you would use in a match.

Underhand Serve: _____   Torque Serve: _____   Overhead Serve: _____

_____

_____

Name: _____   Class: _____

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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Name: _____   **Class:** _____

Adaptive Technology
GRADES 6-8

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

```




















```

Prototype testing plan:

_____

_____

_____

_____

_____