Name: KEY

Module 1.1: KICKING AND ENERGY TRANSFER

Which kicking style has the most energy?

Results may vary among students. Example data below.

	Trial 1	Trial 2	Trial 3
Laces	24 feet	20 feet	25 feet
Inside foot	18 feet	15 feet	21 feet
Outside foot	10 feet	8 feet	7 feet
Drop Kick	32 feet	28 feet	21 feet

Based on the data above, put the kicking styles in order from most energy in collision to least energy in collision.

1. Drop Kick
2. Laces
3. Inside foot
4. Outside foot

Explain how you used your data to rate the kicking styles.

Based on the trial of three kicks, the “Drop Kick” produced the highest average distance, followed by kicking with the top of my foot or laces, inside of my foot and outside of my foot. Based on this data, the most energy is attributed through the farthest distance.

Predict the energy juggling styles. Will jiggling have more or less energy than kicking. Explain how you used your data to make this prediction.

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Results may vary among students. Example data below.

	Energy Rating
Header	3
Knee	1
Thigh	2
Chest	4

Based on the force created during my kicking trial, I felt my legs would produce the highest rate of energy, followed by my head because it's harder and then my chest.

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Module 2.1: CALCULATING CALORIES AND HEART RATE

Answers may vary based on student results. Example data below.

Beats per minute (bpm)	Partner 1	Partner 2
Resting Heart rate	91 beats per minute	86 beats per minute
Maximum Heart Rate	210 beats per minute	209 beats per minute
Heart Rate after 5 minute game (manual measurement)	110 beats per minute	104 beats per minute

CALCULATING CALORIES

- **Step 1:** Convert your weight in pounds to kilograms by dividing by 2. Round to the nearest whole number, if needed.
- **Step 2:** Multiply the MET value by your weight in kilograms. Use the MET value of 8.5.
- **Step 3:** Multiply the product by the time you performed the activity in hours to get the number of calories you burned. *(May need to use a fraction if under 1 hour)***.**
- **Equation:** (Weight/2) x 8.5 x number of hours.

MEASURING CALORIES

Results may vary among students. Example data below.

	Partner 1	Partner 2
Heart rate after first half- 5 minutes of playing (from heart rate monitor)	112 beats per minute	108 beats per minute
Heart rate after 10 minutes of playing (from heart rate	106 beats per minute	102 beats per minute

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monitor)		
Heart rate after 10 minutes of sitting (from heart rate monitor)	93 beats per minute	89 beats per minute

Answers may vary based on student results. Example data based on a *70 pound student.*

	10 minutes (⅙ of a hour)	30 minutes (½ of an hour)	60 minutes (1 hour)	90 minutes (1 and ½ hours)
Calories burned using MET 8.5 (Soccer)	50 calories	149 calories	298 calories	447 calories
Calories burned using MET 1.5 (Sitting)	9 calories	26 calories	53 calories	79 calories

Explain how your heart rate and calories burned changes when you are playing compared to sitting.

The disparity of calories burned through sitting vs. playing among students may vary. To ensure accurate results, review the "*Explain*" section and apply steps 1, 2 and 3.

Example response: I was burning more calories when my heart rate was higher. When I was sitting, I was burning less calories and my heart rate was lower.

Name: KEY

Module 3.1: MEASURING THROW-INS

Measure in Meters: Results may vary among students. Example data below.

Measurements	Throw 1	Throw 2	Throw 3	Throw 4	Throw 5
Standing	3 m	7 m	2.5 m	3.2 m	2.8 m
Kneeling	2.3 m	3.1 m	2.7 m	1.8 m	4 m
Step Into	6 m	4.5 m	2.9 m	5.4 m	3.8 m

Convert your Measurements to Centimeters:
Answers may vary based on student results. Example data below.

Conversions	Throw 1	Throw 2	Throw 3	Throw 4	Throw 5
Standing	300 cm	700 cm	250 cm	320 cm	280 cm
Kneeling	230 cm	310 cm	270 cm	180 cm	400 cm
Step Into	600 cm	450 cm	290 cm	540 cm	380 cm

Which throwing technique produced the greatest results? Why?
Answers may vary based on student results.
Example: The “Step Into” throw produced the greatest results; the movement with the throw produced at least 3 meters more.

What measurement is better to use on the soccer field, meters or centimeters? Why?
Answers may vary based on student results.

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Example: Meters are the best way to measure on the soccer field because you can kick the ball far, so when you measure in centimeters the numbers are very large.

Which is more accurate? Explain your answer.
Answers may vary based on student results.
Example: Centimeters are more accurate because you can actually measure how far the ball went rather than round up or down like in meters.

Name: KEY

Module 4.1: SOCCER BALL VS FUTSAL BALL

General Similarities and Differences

Interpretations and results may vary among students.

Soccer Ball	Futsal Ball
Same texture and feel as the Futsal ball. Feels slightly lighter than the Futsal ball. Material of the ball would be good in the rain.	Same texture and feel as the Soccer ball. Feels slightly heavier than the Soccer ball. Material of the ball would be good in the rain.

System Behavior Data

Results may vary among students. Example data

	Number of Bounces	Height of the first bounce
Soccer Ball	6 bounces	2.8 feet

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Futsal Ball	8 bounces	3.3 feet

System Observations and Diagram Notes

Interpretations and results may vary among students.

Soccer Ball	Futsal Ball
Ball is lighter and bounces more. Ball is more round and easier to control. Does not retain air as well after game-play.	Ball is heavier and bounces less. Ball is not as round as the Soccer ball and has less control. Retention of air is better after game-play then the Soccer ball.

Using your data from the system behavior test (bounce test) and your observations and notes: How is the futsal system different from the soccer ball system:

The Soccer ball performs well in all types of weathers, as well as being easier to control.

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The Futsal ball is a heavier and less forgiving ball yet performs better over long periods of use.

Which would you rather use and why?

The Soccer ball. I enjoy playing all the time -- good weather or bad. I also like playing with a ball that is easier to dribble, pass and shoot.

Name: KEY

Module 7.1: GOAL-LINE TECHNOLOGY

Problem: The Youth community league needs a low cost option to ensure the entire ball crosses the goal line.

Brainstorm Multiple Designs

Results may vary among students.

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

Results may vary among students.

Name: KEY

Build, Design and Test It

For the test, roll the ball into or near the goal nine times: Three times straight through the goal line; three times without crossing the goal line; and three times that only cross the goal line half way. Put an X in the data table if the goal line technology works correctly.

Results may vary among students.

	Test 1	Test 2	Test 3
Straight through the goal line			
Does not cross the goal line			
Half way through the goal line			

Tell a partner about your design: Did it work? What evidence supports that it works? Would you make any changes?

Results may vary among students.

Name: KEY

Module 8.1: PROBABILITY AND PENALTY KICKS

X - Shot Made O - Shot Missed

	1	2	3	4	5	6	7	8	9	10	TOTAL Made
Partner 1	x	x	o	o	o	x	o	x	o	o	4
Partner 2	o	o	x	x	x	o	x	x	o	x	6

Predict who would win a shootout, you or your partner? Justify it with evidence.

Example: I believe “Partner 2” will win the shootout. He/she made an additional two shots out of the 10.

Write a mathematical expression that shows who has a lower chance of winning the shootout.

Partner 1: 4 / 10 = .40

Partner 2: 6 / 10 = .60

Name: KEY

Shoot Out

X- shot made O- shot missed

	1	2	3	4	5	TOTAL Made
Partner 1	x	o	o	x	o	2
Partner 2	x	o	x	o	x	3

Who won the shootout? How was your prediction different from the actual results?

Partner 2: My prediction that Partner 1 had a lower chance of winning the shootout was accurate based on results from the penalty kicks.

Write a mathematical expression that shows who won the shootout.

Partner 1: 2 / 5 = .40

Partner 2: 3 / 5 = .60