Module 1.0: Golf Measurements

Total Distance of Fairway: __150 yards____
Data will vary: Sample data below.

Trial 1

	Distance of hit (feet)	Distance remaining (feet)	Distance of hit (yards)	Distance of hit (meters)	*Extend*: Distance of hit (inches)
Hit 1	65	385	22	20	780
Hit 2	89	296	30	27	1068
Hit 3	57	239	19	17	684
Hit 4	104	135	35	32	1248
Hit 5	92	43	31	28	1104

Trials 2 - 4
Answers will vary based on student data.

Write an expression for calculating the distance remaining.
_____feet/3-total distance_____

Write an expression for converting from feet to yards.
_____feet/3_____

Write an expression for converting from yards to meters.
_____(feet/3)*0.9_____

Write an expression for converting from yards to feet.
_____yards*3_____

Write an expression for converting from feet to inches.
_____feet*12_____

Module 2.0: Force of a Golf Swing

Experimental Guide: Balanced and Unbalanced Forces

Answers will vary for student design experiments and scaffolded experiments.

Module 3.0: Scoring in Golf

Hole	1	2	3	4	5	6	7	8	9	TOTAL	10	11	12	13	14	15	16	17	18	TOTAL	18-hole TOTAL	Par Score
PAR	5	4	3	4	4	5	3	4	4	**36**	4	4	3	4	5	3	4	5	4	**36**	**72**	**Par**
Bradley	5	4	2	5	4	4	2	4	5	35	3	4	4	4	4	4	5	5	4	37	72	0
Snell	4	4	3	4	5	5	2	4	5	36	4	3	4	5	4	2	5	6	4	37	73	+1
Smith	5	4	4	4	5	4	3	4	4	37	4	3	3	6	5	4	4	6	3	38	75	+3
Bradshaw	4	5	3	4	5	4	3	5	5	38	4	3	2	5	6	4	4	5	4	37	75	+3
Gibson	5	4	3	3	4	4	3	4	4	37	3	5	4	4	5	4	4	5	4	38	75	+3
Palmer	3	4	3	5	5	5	4	4	4	37	4	5	4	6	5	3	4	5	4	40	77	+5
Raymo	4	5	3	5	5	6	2	5	4	39	3	6	3	5	6	3	4	6	3	39	78	+6
Davis	5	3	4	4	5	5	3	4	6	39	5	4	3	5	6	4	4	5	4	40	79	+7
Marone	6	4	3	4	4	5	4	5	5	40	4	4	2	4	5	4	4	5	7	39	79	+7
Stein	5	4	4	5	4	5	4	4	5	40	5	4	3	5	6	3	4	4	6	40	80	+8
Student Player 1																						
Student Player 2																						

Based on the scorecard above: What are steps to calculating a golf score?

Answers may vary: Example responses below.

1. Add the player's strokes for the first 9-holes.

2. Add the player strokes for both the first and second 9-holes.

3. Add-up par for the first 9-holes.

4. Add-up par for second 9-holes and total both 9-holes.

5. Subtract your total score (step 2) from the total par (step 4).

Using the scorecard below, record and calculate you and your group members scores.
Answers will vary.

Write a mathematical expression using greater than and less than symbols that compares you and your classmates scores. Who would have won the hole?
Answers will vary.
Remind students that in golf the lowest score is the winner.

MODULE 4.0: Engineering a Pushcart

Create a device that will help someone move their golf bag throughout the course to eliminate the weight challenge of carrying the clubs 3 - 4 miles.

Answers will vary based on student response and class discussion.

Criteria	Constraints
Examples: ● Must be under 10 pounds ● Hand powered ● Be able to be used by individuals of all ages and abilities	Examples: ● Weight ● Non-motorized ● Low cost materials

Option 1: Potential Design Drawings will vary based on student designs
Option 2: Potential Design Drawings will vary based on student designs
Option 3: Potential Design Drawings will vary based on student designs

Module 5.0: What is a Golf Ball?

Predictions: Describe how each ball will function as a golf ball. Think about controlling the direction, distance, and bounce of each ball.

Answers will vary based on student observations.

Tennis ball: Too heavy and large; won't go as far; will bounce more than a golf ball

Baseball: Too heavy and large; won't go as far or fast; won't bounce

Softball: Too heavy and large; won't go as far or fast; won't bounce

Ping Pong ball: Too little; will bounce more than a golf ball

Sample Data: Distance to target 7ft; sample data demonstrates that the tennis ball and ping-ball over shooting the target.

	Number of putts to hit the target	Distance of Putt 1	Distance of Putt 2	Distance of Putt 3	Distance of Putt 4	Distance of Putt 5
Tennis ball	4	6 ft	8 ft	4 ft	1 ft	
Golf Ball	2	5 ft	2 ft			
Baseball	6	0.5 ft	1 ft	1.5 ft	2 ft	1.5 ft
Softball	7	1 ft	0.5 ft	2 ft	1 ft	0.5ft
Ping pong ball	5	6 ft	3ft	11ft	10ft	6 ft

	Circumference	Materials	Weight	Texture	Other features
Tennis ball	8 in	Rubber Air Felt	2.0 oz	Rough	Two circulating seams in rubber
Golf Ball	5 in	Rubber Plastic	1.6 oz	Dimples, smooth	Dimples
Baseball	9 in	Leather Cork/Rubber	5 oz	Smooth	Two circulating seams with stitching
Softball	11 in	Leather Cork/Rubber	6 oz	Smooth	Two circulating seams with stitching
Ping pong ball	5 in	Plastic Air	0.095 oz	Smooth	

Use the data from the two data tables: What properties and materials support a golf balls' function? How do they differ from the other balls' properties?

Answers will vary based on student data.
Example response: The mass and volume relationship (density) differs for each ball and the golf ball weighs less than most of the other balls (except the ping pong ball). It is also smaller than all the balls but the ping pong ball. The golf is not hollow like the ping pong and tennis balls and it has a unique texture (dimples) compared to all the other balls. Finally, it has a unique combination of materials, rubber (heavy) and plastic (light), and the baseball and softball have two heavy materials and the ping pong and tennis balls both have an ultra light material (air).

Diagram the Putter and Iron using angles and lines: Answers will vary


Make a prediction

How does a club's angle influence the height and distance of the ball?

A larger angle will _decrease_____ (increase, decrease) the height and increase___ (increase, decrease) the distance.

Collect Data

Use the data table below: Hit the golf ball three times with each club and measure the distance of the hit. Remember to control the style and force of your swing. You should swing the same way for each trial.

Sample Data below
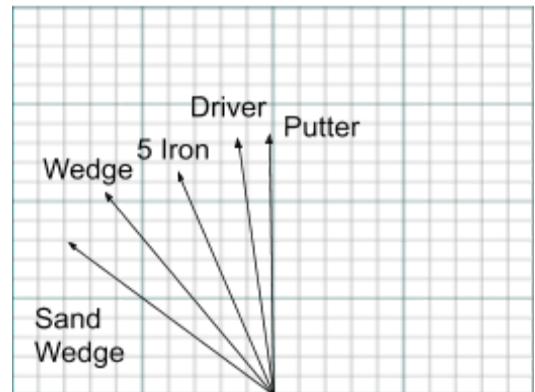
	Trial 1 (Distance)	Trial 2 (Distance)	Trial 3 (Distance)
Putter	4 yards	8 yards	6 yards

Iron	10 yards	6 yards	10 yards

Use the data table below: Hit the golf ball at the target (soccer net, gym wall, etc.) three times with each club and measure the height of the hit. Remember to control the style and force of your swing. You should swing the same way for each trial.

	Trial 1 (height)	Trial 2 (height)	Trial 3 (height)
Putter	0 ft	0 ft	0 ft
Iron	5 ft	6 ft	4 ft

Conclusion
How does the angle of the club influence the height and distance of the ball? Use evidence from your experiment to support your answer.
Answers will vary.
Example response: The higher the angle (not including the putter) will decrease the height of the ball but increase the distance the ball travels.

Based on what you know about angles, how does the change in angle affect the *height* of the ball?
Answers will vary.
Example response: Lower club angle, increase the height of the ball. A sand wedge has the lowest angle and will increase the height of the ball the most.

Based on what you know about angles, how does the change in angle affect the *distance* of the ball?
Answers will vary.
Example response: Lower club angle, decreases the distance of the ball. A sand wedge has the lowest angle and will travel the shortest distance.

Module 8.0: Climate and Weather in Golf

Look at the maps. What do you notice, wonder and think about what you see?

Notice (Observe)	Wonder (Question)	Think (Infer)
Guiding Question: Why do you think some areas have more golf courses than others?		
Example responses: I notice there is a high density of courses in the East and Midwest. I notice there is the lowest density of courses in the Southwest.	**Example response:** Why are there so many courses in the Midwest?	**Example response:** There are more golf courses near water (coasts, great lakes)

Guiding Questions: What connection do you see between climate and golf course concentration?		
Notice (Observe)	*Wonder (Question)*	*Think (Infer)*
Example responses: Where there is more precipitation, there are more golf courses.	**Example responses:** If you can't water grass with salt water, why are there so many golf courses near the ocean?	**Example responses:** Climate makes it easier to maintain a golf course in certain areas of the country.

Circle your US region choice:

Northeast   Northwest   Southwest

South   Midwest   Mountain

Does the climate, perception, and temperature of your regional area support golf courses?
Answers will vary.

What evidence from the climate maps supports your claim from above?
Answers will vary.

Why does the climate of your region either support or not support golf courses? List at least three reasons.
Answers will vary.