

Performance Based Learning and Assessment Task

Activity/Task Title

I. ASSESSMENT TASK OVERVIEW & PURPOSE:

For this activity, the student will work with a group to collect and analyze data about fuel efficiency in certain vehicles. The student will use the data they collect to construct a table and graph to represent the data. Next, they will develop a linear function to describe the data, as well as the trends of the data. This will give the student the opportunity to practice developing function rules, as well as representing functions by a table and a graph. Finally, the student will be asked to make a prediction based on the data collected.

II. UNIT AUTHOR:

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III. COURSE:

Algebra 1

IV. CONTENT STRAND:

Algebra 1, Functions

V. OBJECTIVES:

A.7 The student will investigate and analyze function (linear and quadratic) families and their characteristics both algebraically and graphically, including

- a) determining whether a relation is a function;
- b) domain and range;
- e) finding the values of a function for elements in its domain and
- f) making connections between and among multiple representations of functions including concrete, verbal, numeric, graphic, and algebraic

VI. REFERENCE/RESOURCE MATERIALS:

Calculator, graph paper, internet, "Fuel Efficiency Function" handout

VII. PRIMARY ASSESSMENT STRATEGIES:

See attached assessment list

VIII. EVALUATION CRITERIA:

See attached assessment list

IX. INSTRUCTIONAL TIME:

Approximately 75 minutes

FUEL-EFFICIENT FUNCTION ACTIVITY

Scenario:

Happy birthday!!! You are 16 years old! In honor of your birthday you get to pick a car of your choice! However, due to rising cost of gas, you must choose a car from a list of the most fuel efficient cars.

Directions: (NEATLY answer each question on your own piece of paper. One paper is to be turned in for the entire group.)

- 1.) You and your team are to decide which type of vehicle you will choose from. (Select one of the following).
 - Trucks
 - Midsize
 - Compact
- 2.) Research the top 5 most fuel efficient cars from that type. Please site where you received your information. For example, if you use an internet site, write down the site where you got your information.
- 3.)) Use the data you collected from the five most fuel efficient vehicles based on type to find an appropriate model for each vehicle. You may decide which method you use to represent your data.
- 4.) After you have collected the data, your team will decide which is the best vehicle based on the evidence and graph the evidence. Give an explanation in paragraph form as to why your group picked the vehicle you did.
- 5.) Find a vacation destination and predict your fuel usage for your round trip excursion.
- 6.) Using the car you picked and the data you collected, estimate the amount of money it would take for you and your group to travel to Disney World for your birthday! (Hint: Research how many miles it is to Florida, research the average cost of fuel).

Assessment List

Number	Element	Point Value	Self-Assessment	Teacher-Assessment
1	Neatness of Work	5		
2	Accurate/Reliable Research	5		
3	List of Top 5 Fuel-Efficient Vehicles	5		
4	Appropriate Model for each Vehicle	5		
5	Data Representation	5		
6	Fuel Usage Prediction	5		
7	Explanation for chosen vehicle	5		
8	Estimation of money for trip	5		
9	Completion of Activity	5		

Rubric

#	Element	0	1	2	3	4	5
1	Neatness of work	No effort	Un-readable	Sloppy	Somewhat Neat	Mostly Neat	Neat and organized
2	Accurate/Reliable Research	No effort	-----	-----	-----	-----	Cited work
3	List of Top 5 Fuel-Efficient vehicles	No effort	Listed 1 Vehicle	Listed 2 Vehicles	Listed 3 Vehicles	Listed 4 Vehicles	Listed all 5 Vehicles
4	Appropriate Model for each Vehicle	No effort	Model for 1 Vehicle	Model for 2 Vehicles	Model for 3 Vehicles	Model for 4 Vehicles	Model for 5 Vehicles
5	Data Representation	No effort	Listed 1 Vehicle	Listed 2 Vehicles	Listed 3 Vehicles	Listed 4 Vehicles	Complete Representation
6	Fuel Usage Prediction	No effort			Effort was given, incorrect prediction		Effort was given, correct prediction
7	Explanation for Chosen Vehicle	No effort	-----	-----	1-2 sentence reasoning	-----	3-4 sentence reasoning
8	Estimation for Money Trip	No effort	Incorrect Estimation	-----	-----	-----	Correct estimation
9	Completion of Activity	No effort	Omitted 6-7 Questions	Omitted 4-5 Questions	Omitted 2-3 Questions	Omitted 1 Question	Total Completion

Student Work/Benchmark

Fuel-Efficient Activity

1.) Trucks

2.) Top 5 Fuel Efficient Trucks (We received the following information at www.edmunds.com)

- 1.) Toyota Tacoma
- 2.) Ram 1500
- 3.) Nissan Frontier
- 4.) Chevrolet Silverado 1500
- 5.) GMC Sierra 1500

3.)

Vehicle	Average Miles Per Gallon/MPG
Toyota Tacoma	23 MPG
Ram 1500	23 MPG
Nissan Frontier	21 MPG
Chevrolet Silverado	20 MPG
GMC Sierra 1500	20 MPG

Equations:

- 1.) Toyota Tacoma: $y=23x$
- 2.) Ram1500: $y=23x$
- 3.) Nissan Frontier: $y=21x$
- 4.) Chevrolet Silverado: $y=20x$
- 5.) GMC Sierra: $y=20x$

Tables for each vehicle:

1.) Toyota Tacoma

$$Y=23x$$

D: {5, 10, 15, 20, 25}

R: {115, 230, 345, 460,
1075}

Gallons Consumed (x)	Miles Driven (y)
5	115
10	230
15	345
20	460
25	575

2.) Ram 1500

$$Y=23x$$

D: {5, 10, 15, 20, 15}

R: {115, 230, 345, 460,
1075}

Gallons Consumed (x)	Miles Driven (y)
5	115
10	230
15	345
20	460
25	575

Gallons Consumed (x)	Miles Driven (y)
5	105
10	210
15	315
20	420

3.) Nissan Frontier

$$Y=21x$$

D: {5, 10, 15, 20, 25}

R: {105, 210, 315, 420, 525}

25	525
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4.) Chevrolet Silverado

$$Y=20x$$

D: {5, 10, 15, 20, 25}

R: {100, 200, 300, 400, 500}

Gallons Consumed (x)	Miles Driven (y)
5	100
10	200
15	300
20	400
25	500

5.) GMC Sierra

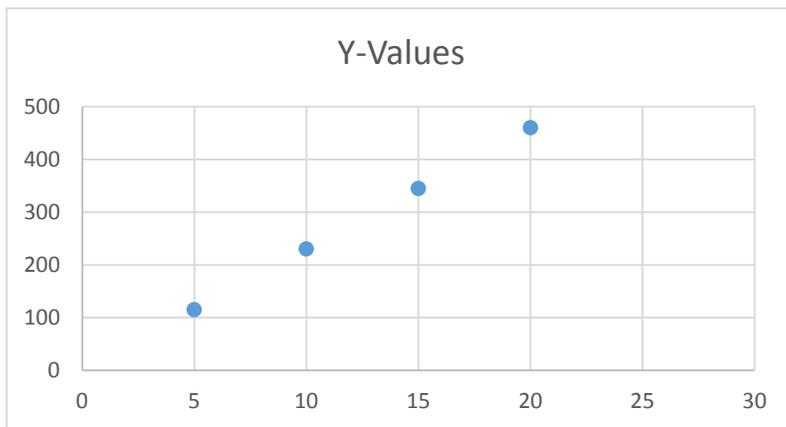
$$Y=20x$$

D: {5, 10, 15, 20, 25}

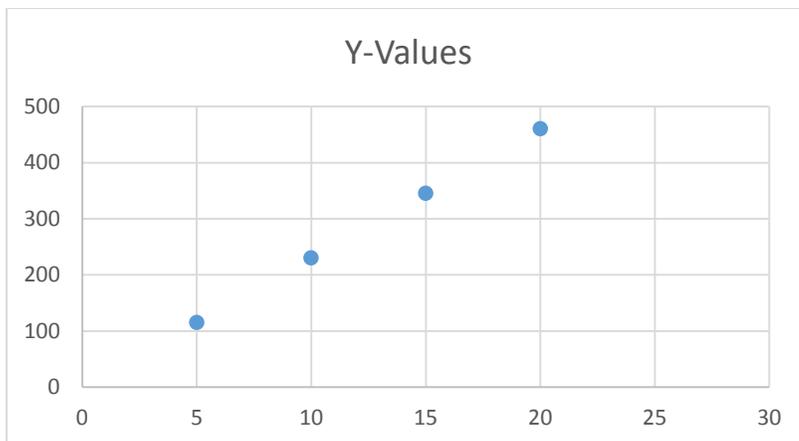
R: {100, 200, 300, 400, 500}

Gallons Consumed (x)	Miles Driven (y)
5	100
10	200
15	300
20	400
25	500

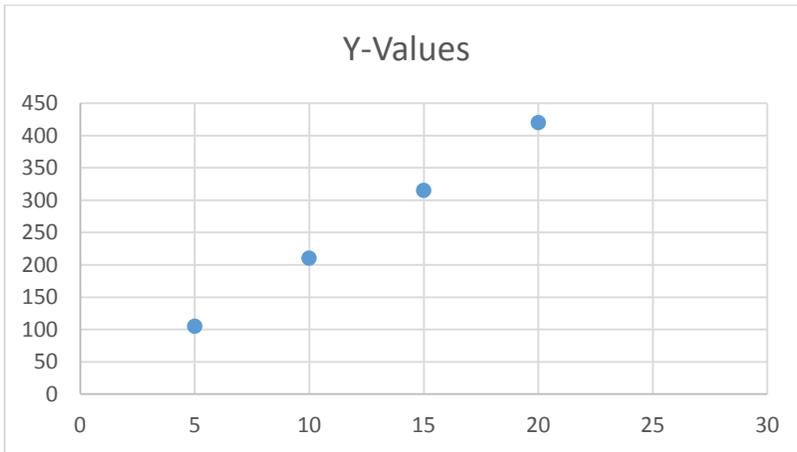
Toyota Tacoma:



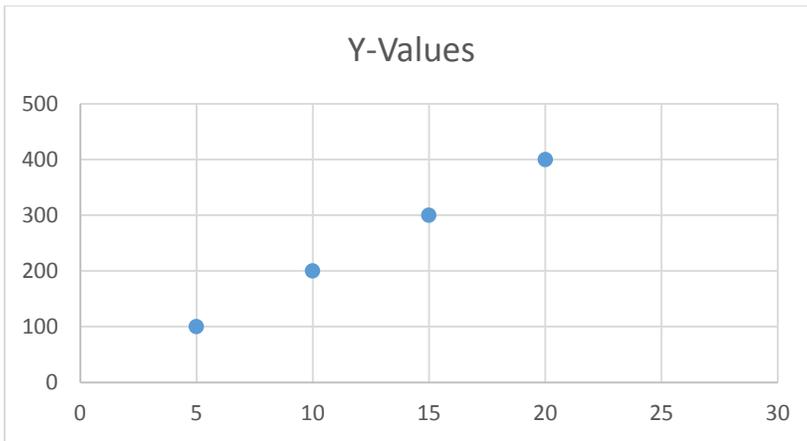
Ram 1500:



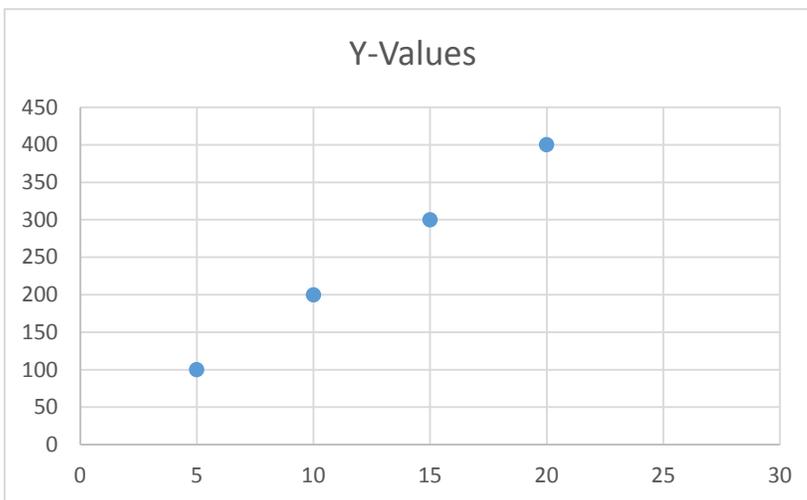
Nissan Frontier:



Chevrolet Silverado:



GMC Sierra:



4.) My team chooses the Chevrolet Silverado 1500. We chose that truck because it is a nice truck with good gas mileage. It gets 20 miles per gallon.

5.) For our vacation destination, we chose Myrtle Beach, South Carolina. It is approximately 400 miles away. With our Chevrolet Silverado 1500, it would take about 20 gallons of fuel to make that trip.

6.) We found that it is approximately 715 miles to Disney World from here. We also found that the average price of gas is \$3.04. Using the equation we came up with, it would take us about 36 gallons of gas to get to Disney World. The truck that we picked holds 26 gallons of fuel. So, we would need to fill up about 1.5 times on our trip to Disney world. Since a tank of gas would cost us almost \$80, it cost us \$118.56. We will estimate that to \$120.