

**AACA Museum**  
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**Graphing & Data Predictions**  
Includes PowerPoint Presentations  
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Content:

- Gas prices and the cost to fill a tank depending on size

Knows:

- Gas prices in the past and present
- Using line of best fit
- Line graph
- Bar graph (histogram)
- Scatter plot
- Linear Equations
- Research

Dos:

- Plot different types of graphs and describe what they are used for
- Compare data and patterns and make correlations from past to present
- Use line of best fit to make predictions for future prices
- Research gas prices and gas tank sizes from the past and present
- Discuss data
- Write about the comparisons in data

EQ:

- How have gas prices and the average miles per gallon over the past 100 years?
- How and when are different types of graphs used to display data about gas prices and car information?

Prior Knowledge:

- Coordinate plane
- How to write linear equations
- How to find slope
- How to find intercepts
- How to plot points

Standards:

**M8.E.4.1.2:** Draw conclusions, make inferences and/or evaluate hypotheses based on statistical and data displays

**M8.E.4.1.2:** Make predictions based on survey results or graphs (bar, line, circle, scatterplots, etc.).

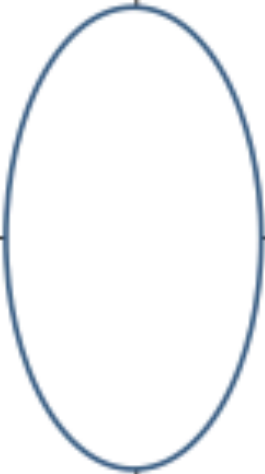
**M8.E.4.1.1:** Fit a line to a scatter plot and/or describe any correlation between the two variables (positive, negative, strong, weak or none).

**M8.E.1.1.1:** Choose and/or explain the correct representation (graph) for a set of data.

**A.1.1.2.1:** Write, solve, and/or graph linear equations and inequalities using various methods.

# Frayer Model

<b>Definition in your own words</b>	<b>Facts/characteristics</b>
<b>Examples</b>	<b>Nonexamples</b>

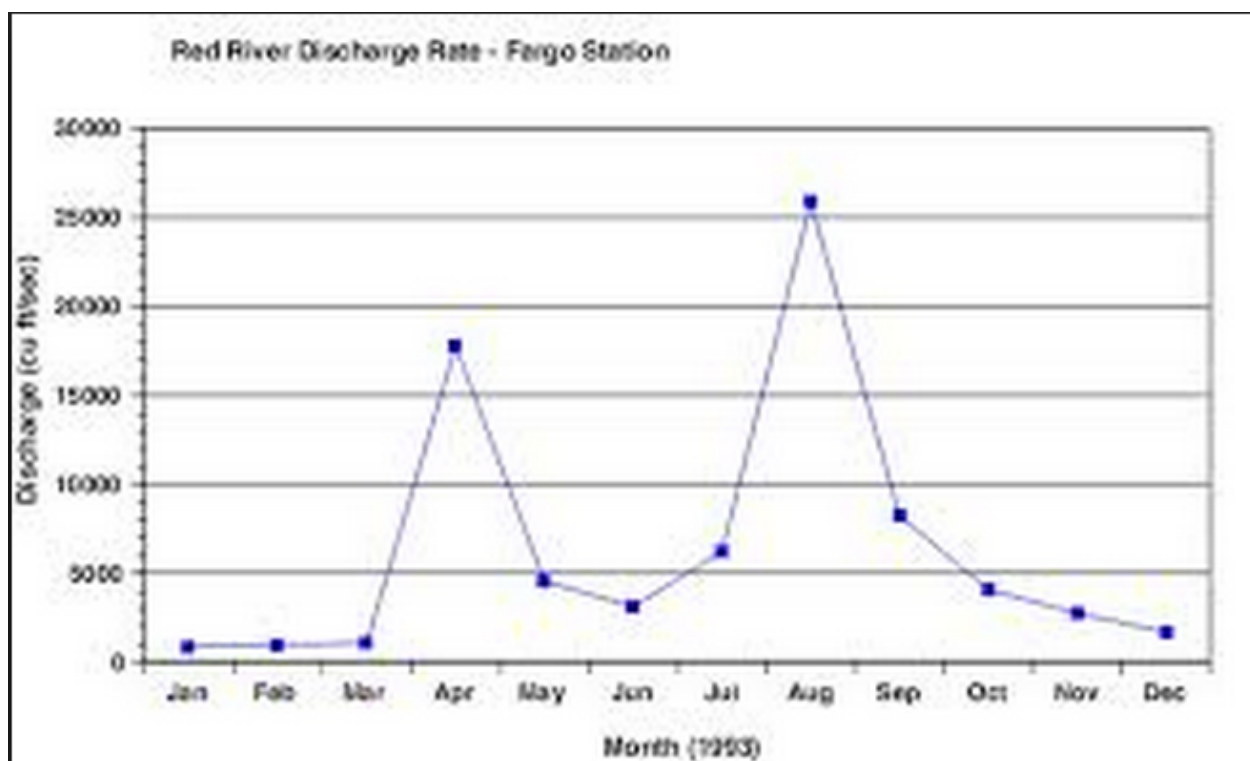
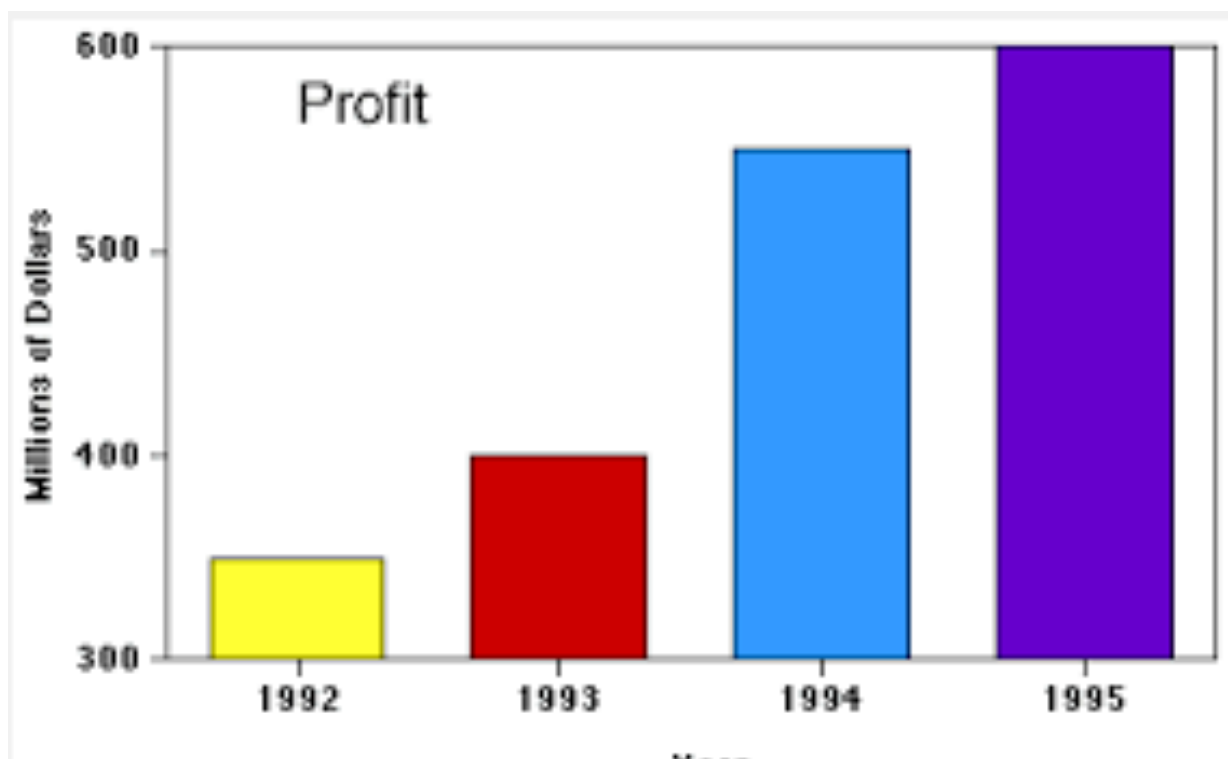
A diagram of the Frayer Model. It consists of a central blue-outlined oval. Four lines extend from the top, bottom, left, and right of the oval, connecting it to the four quadrants of a larger rectangle. The quadrants are labeled: top-left is 'Definition in your own words', top-right is 'Facts/characteristics', bottom-left is 'Examples', and bottom-right is 'Nonexamples'.

# KWL Chart

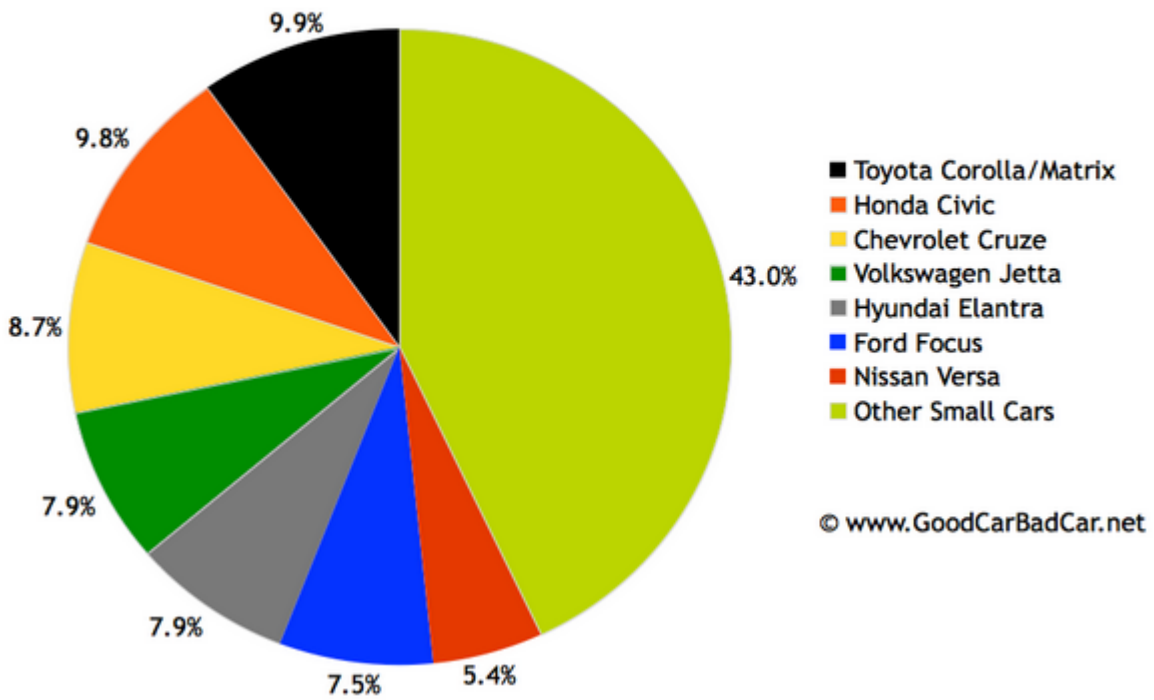
Topic: Writing Linear Equations

What I <b>Know</b>	What I <b>Want</b> to Know	What I <b>Learned</b>

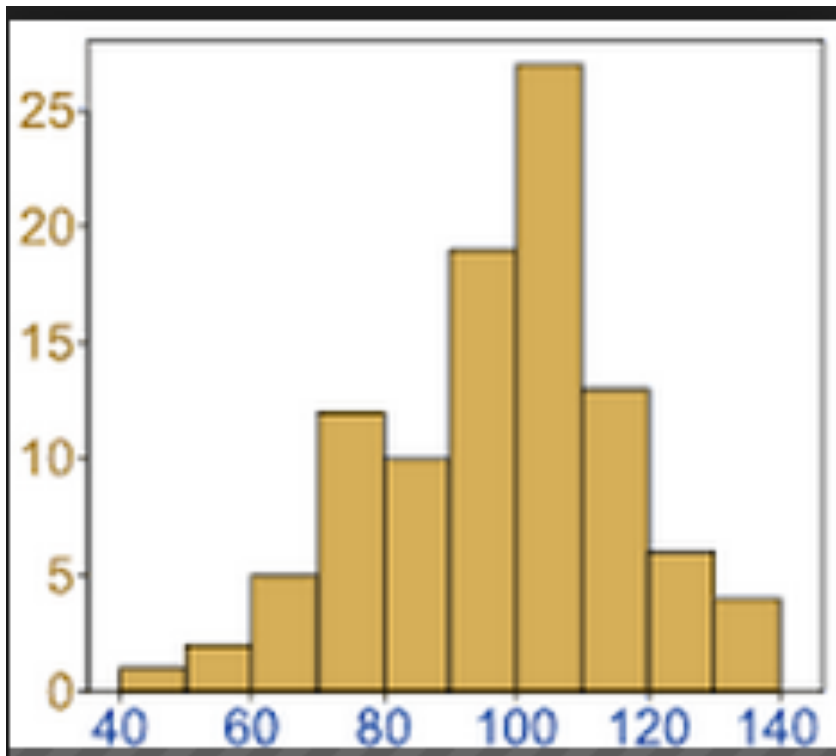
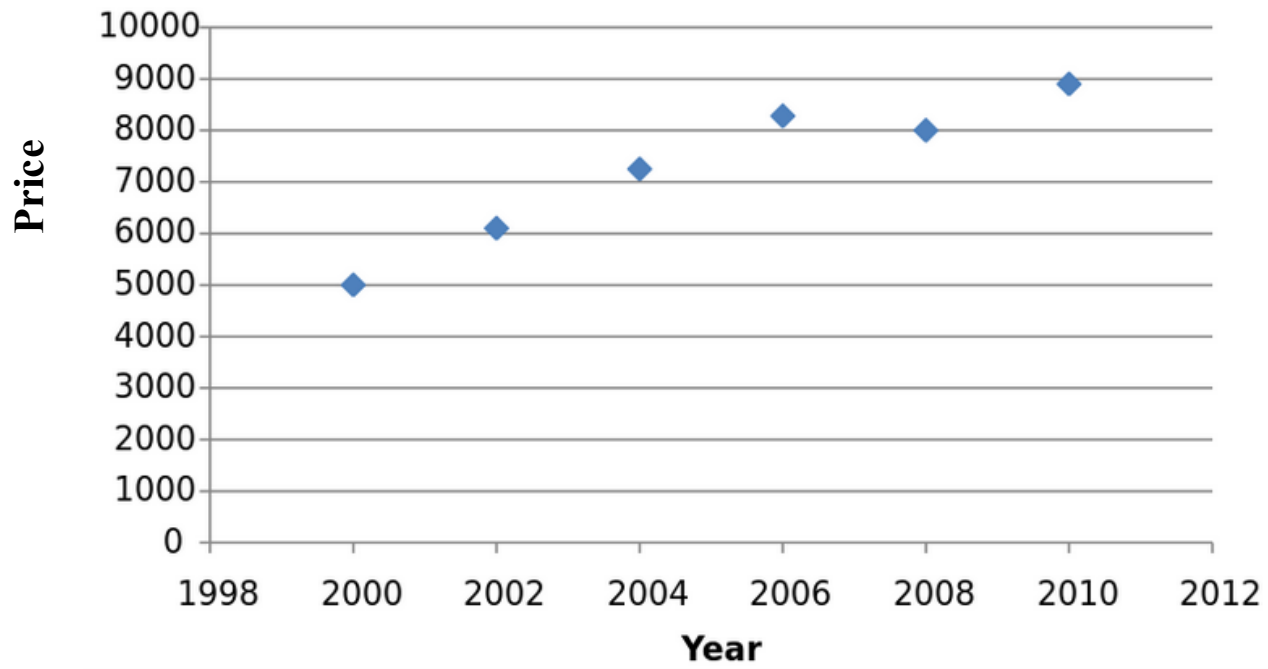




## Small Car Sales In America October 2011



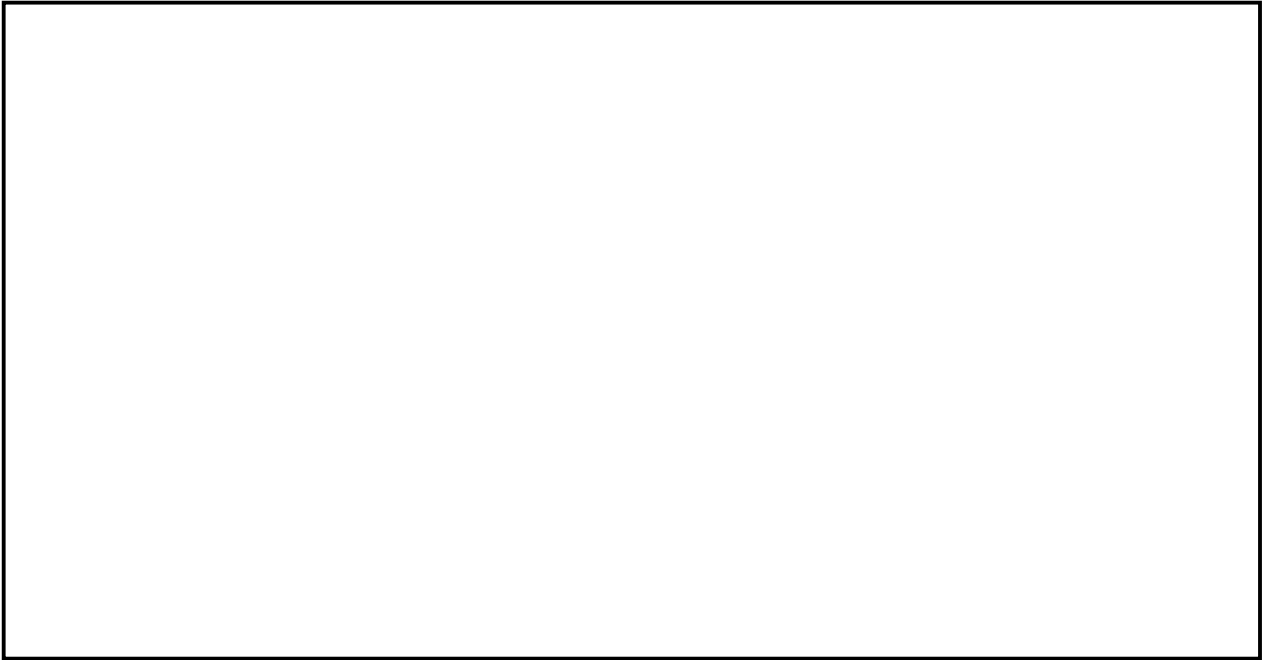
Prices of Car



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

Date: \_\_\_\_\_

**Directions:** Construct a bar graph using the data given below.

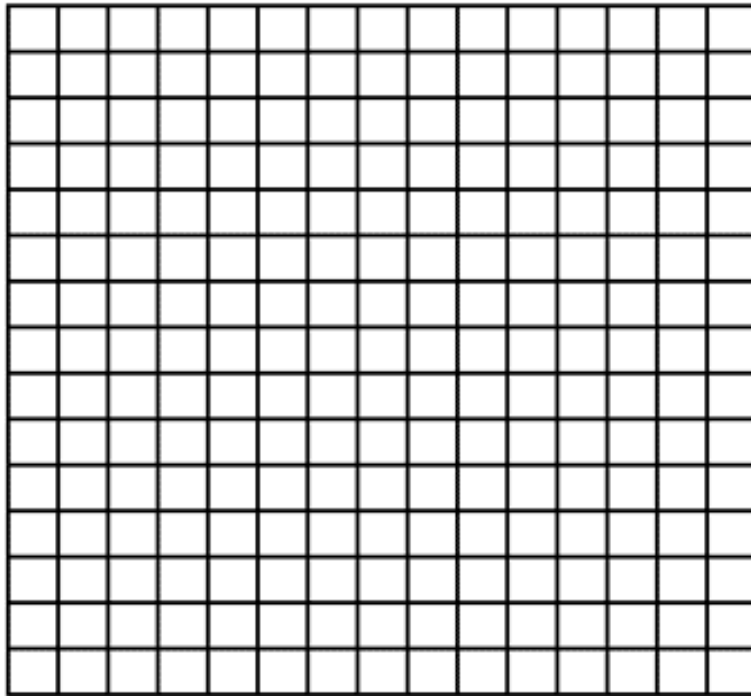


Speed of Car	Miles per Gallon
25	20
35	18
45	17
55	14
65	12
75	10
85	8

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

Date: \_\_\_\_\_

**Directions:** Construct a line graph with the given data below.

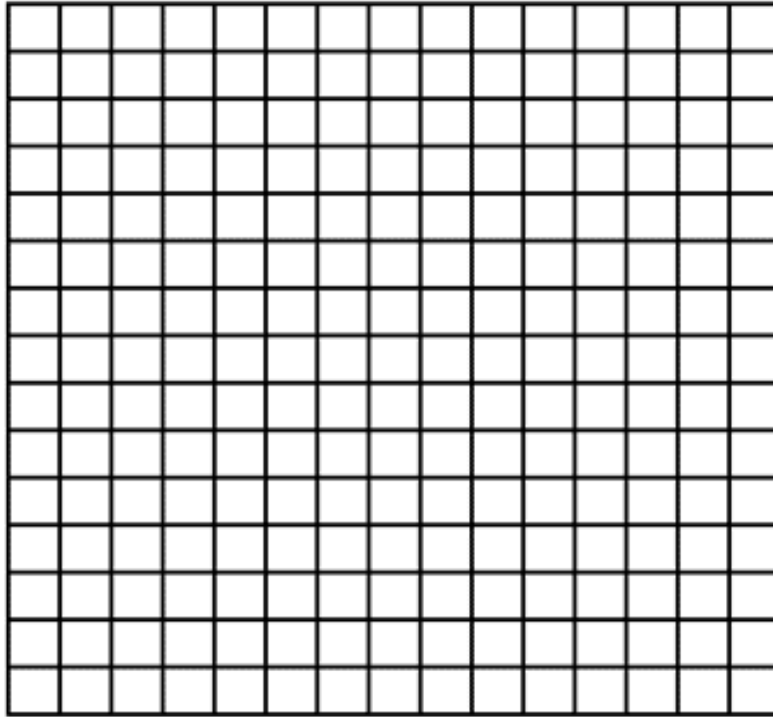


Width of a Tire (in millimeters)	Jump (cm)
200	603
210	578
225	531
240	487
250	401
265	357
280	308

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

Date: \_\_\_\_\_

**Directions:** Construct a scatter plot with the given data below.



Year of Car	Price of Car
2000	5,000
2002	6,015
2004	7,035
2006	8,130
2008	8,000
2010	9,028

## Line Graphs

1. What is a line graph? Look up the definition.



2. How many cars were sold in February?
3. In which two months were the same number of cars sold?
4. What is the difference in number of cars sold in the months of May and April?
5. What is the difference in the number of cars sold between the months in which the maximum and minimum cars were sold?

## Scatter Plot

1. What is a scatter plot? Look up the definition.

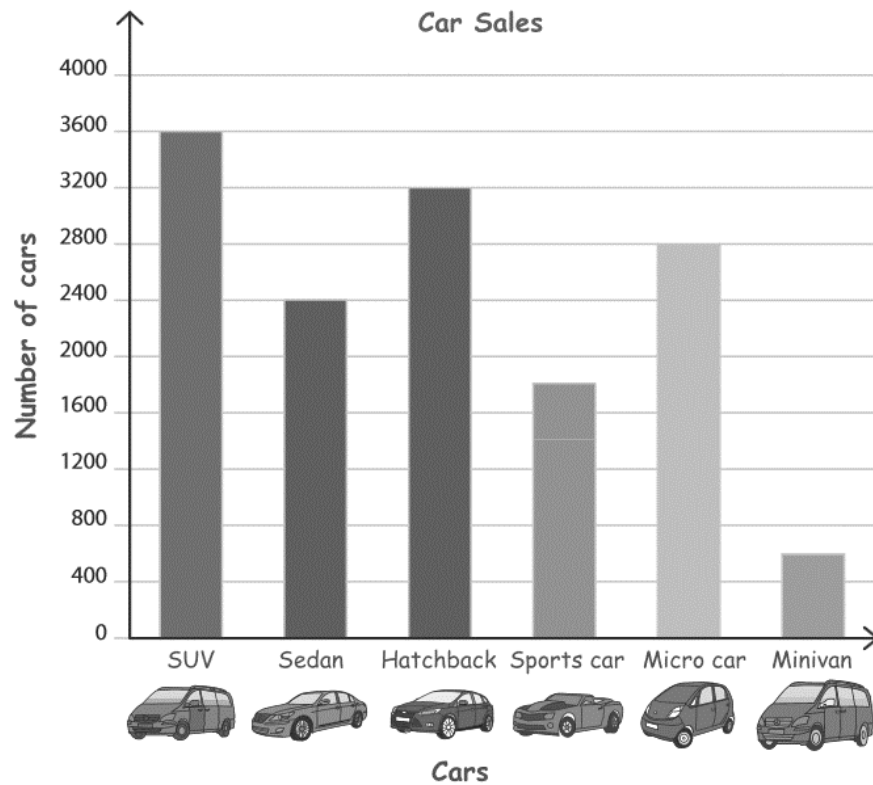


2. If the graph were to continue, what would you guess would be the stopping distance of a car traveling at 45 km/hr?

3. Does the graph look like it has a positive or negative relationship? Explain your thoughts.

## Bar Graphs

1. What is a bar graph? Look up the definition.



2. Which type of car was sold the most?
3. How many fewer minivans were sold than micro cars?
4. How many more hatchbacks were sold than Sedans?
5. Find the total number of cars sold.

Topic \_\_\_\_\_  
Date \_\_\_\_\_

Class \_\_\_\_\_

**Essential Questions:** How do we draw a line of best fit?

**Objectives:** SWBAT: draw a line of best fit given a set of data and write an equation for the line.

**Activating Strategy:** Review of linear equations. Students will complete 3 problems on linear equations.

**Game Plan: Step-by-Step**

- A/S
- Short presentation on line of best fit and how to find it. This will include an example.
- Give the students a set of data. Have the students plot the points. Give the students an uncooked piece of spaghetti to find the line of best fit of the data. The students will then draw this line and find the equation for it.
- S/S

**Summarizing Strategy-** Key Points Summary

Students will write a list of the key points of how to find a line of best fit.

**Differentiation**

Students can choose to work individually or with a partner on the activity.  
Give varying difficulties of sets of data while students complete activity.

**Assessment/Assignment & Materials needed**

Homework: Benchmark 2

Materials: Spaghetti

Graph paper

Rulers

Worksheet for activity

Topic \_\_\_\_\_  
Date \_\_\_\_\_

## Class Lesson Plan 5

**Essential Questions:** How are predictions made and on what are they based?

**Objectives:** SWBAT: Make predictions based on given data

**Standards: M8.E.4.1.2:** Draw conclusions, make inferences and/or evaluate hypotheses based on statistical and data displays

### Activating Strategy:

Sticky Notes: Students will receive sticky notes to post on to a wall in the classroom. Ask the students to write down how they think predictions in math are made. Have the students answer the question “why do think companies need to make predictions?” and ask what they think the predictions are made from.

### Differentiation

Sticky notes

### Game Plan: Step-by-Step

- Activating Strategy
- Have students look at car data from the past and the present like the Edsel, Pinto and car recalls as well as Ford, Chevy, and Toyota
- Use the data to have students make predictions based upon the data.
- Have class discuss what predictions can be made from different types of data.
- Summarizing Strategy

### Summarizing Strategy

Review the sticky notes and add sticky notes with other ways to predict outcomes from data and what the students have learned.

### Assessment/Assignment & Materials needed

Worksheet

Materials:

Sticky Notes

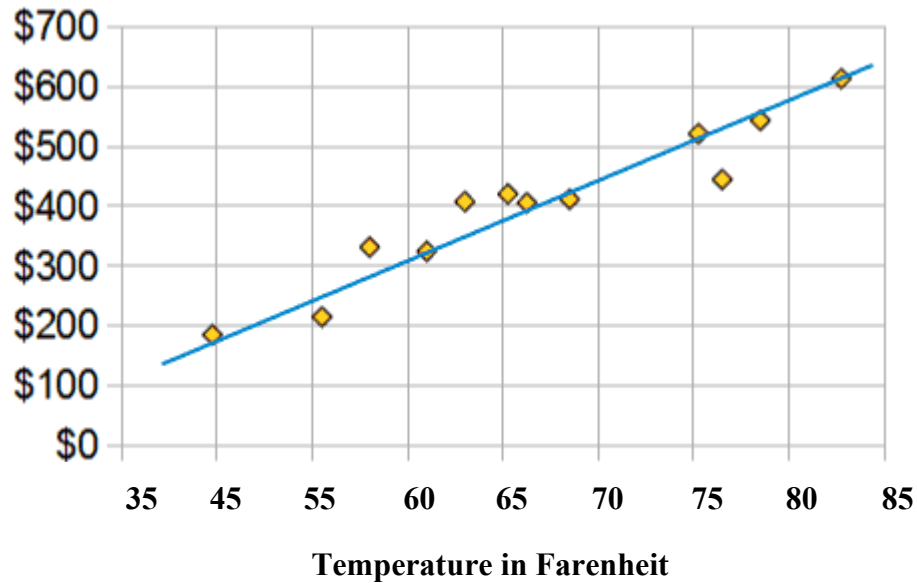


Name: \_\_\_\_\_

Date: \_\_\_\_\_

### **Making Predictions Worksheet**

A local car wash business keeps track of how many cars they wash versus the average temperature on that day. Provided below is a scatter plot and line of best fit for the car wash business during the past 12 months.



1. Write the equation of the line of best fit provided in the picture.
2. Based upon the equation that you made. Make a prediction for the following temperatures. Include units.
  - a. 90°F
  - b. 20°F
  - c. 100°F

### Car Project (Performance Task)

You will be working with 6 different cars. Choose one specific car from 1920, 1940, 1960, 1980, 2000 and present of the same general make and model. Research the price for gas the year the cars you chose was manufactured as well as the average miles per gallon of the car. You will be making 2 graphs. In the first graph you will plot data points for each specific year and price of gas, and for the second graph you will plot data points for each specific year and miles per gallon. You will draw a line of best fit for each graph and write an equation that represents each line. From this equation you will pick three future years and predict gas prices and miles per gallon. Summarize your findings of the car's mile per gallon and gas prices from each year in a minimum of two paragraphs. You will discuss your research and finding in the first paragraph and you will discuss your graphs and future prices in the second paragraph.

#### Benchmark 1

Students will choose two points to plot on a graph. They will connect the dots and write an equation that represents the lines.

#### Benchmark 2

Scatter Plot Benchmark Worksheet

Rubric Performance Task	Exemplary	Proficient	Adequate	Poor
Research	Students collected all information for the 6 cars with all sources provided.	Students collected most of the information for the 6 cars with most sources provided.	Students collected some of the information for the 6 cars with some sources provided.	Students collected little to no information for the 6 cars with little to no sources.
Label for Graphs	Both graphs are correctly labeled with units and an appropriate title.	Both graphs are labeled with units and a title but may have a few mistakes or missing parts.	Only one graph is labeled with units and a title with many mistakes and/or missing parts.	Neither graph is labeled with units and a title.
Plotted Points for Graphs	Both graphs have all points plotted correctly	Both graphs have most points plotted correctly	Only one graph has many mistakes.	Both graphs have many mistakes
Line of Best Fit and Equation	Both graphs have a correctly placed line of best fit with correct equations	Both graphs have a line of best fit with mostly correct equations	Only one graph has a line of best fit with an equation	Neither graph has a line of best fit or an equation.
Summary	First paragraph summary was complete and appropriate. Second paragraph expertly included information on future prices and mpg of all cars.	First paragraph summary was mostly complete and appropriate. Second paragraph included most information on future prices and mpg of the cars.	Only one paragraph is included and is appropriate. Or First paragraph was semi-complete and appropriate. Second paragraph included some information on future prices and mpg of the cars.	Neither paragraph was included. Or First paragraph summary was not complete or appropriate. Second paragraph did not include information on future prices and mpg for the cars.
MUGS	Typed, double spaced, 12 points where appropriate. Grammar,	Mostly typed, double spaced, 12 points. Few grammar, syntax, &	Some typed, double spaced, or 12 points. Many grammar, syntax, &	Minimally typed, double spaced, and not 12 points. Numerous

	syntax, & spelling were perfect.	spelling errors.	spelling errors	grammar, syntax, & spelling errors.
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Topic \_\_\_\_\_  
Date \_\_\_\_\_

Class \_\_\_\_\_

**Essential Questions:** How and why is research conducted?

**Objectives:** SWBAT: Conduct proper research using credible sources

**Standards: M8.E.4.1.2:** Draw conclusions, make inferences and/or evaluate hypotheses based on statistical and data displays

**Activating Strategy: Quick Write**

Have students write on the topic of research. Ask questions like: What have you researched before? How did you conduct the research? What does a credible source look like?

When students are finished writing, have students share their responses with the class.

**Game Plan: Step-by-Step**

- Activating Strategy
- Have students complete an online mini-research worksheet in groups on how to conduct proper research.
- When groups are finished, review answers to the worksheet and answer any questions that students have
- Time-allowing, let students start working on research for performance task
- Summarizing Strategy

**Summarizing Strategy: Group Review**

Have students get in groups of 4-5. Have students discuss what they have learned about how to conduct research and what a credible source looks like. Have groups share their responses with the class.

**Differentiation**

Students can pick their groups.

Students are able to find different sources but arrive at the same conclusion.

**Assessment/Assignment & Materials needed**

Homework: Start and/or finish research for Performance Task

Materials:

Access to internet or computer lab

Worksheet on conducting research

Topic \_\_\_\_\_  
Date \_\_\_\_\_

Class \_\_\_\_\_

**Essential Questions:** What are different types of graphs and how can they be used?

**Objectives:** SWBAT: identify different types of graphs and their uses.

**Activating Strategy:** Matching

Put examples of each type of graph on the board and then have the students match them to the type of graph. These types of graphs will be included in a word bank.

**Game Plan: Step-by-Step**

- A/S
- Station work on line graphs, bar graphs, and scatter plots
- S/S

**Summarizing Strategy-**Aha! and Huh?

Students will write down 1 or 2 “ahas” (something you learned) and 1 or 2 “huhs” (things you still have questions about)

**Differentiation**

Let the students choose their groups or choose the groups for them. Have some stations that are individual work and others that are group work.

**Assessment/Assignment & Materials needed**

Homework: Worksheet

Materials: worksheets for each station