LINEAR REGRESSION & DATA ANALYSIS

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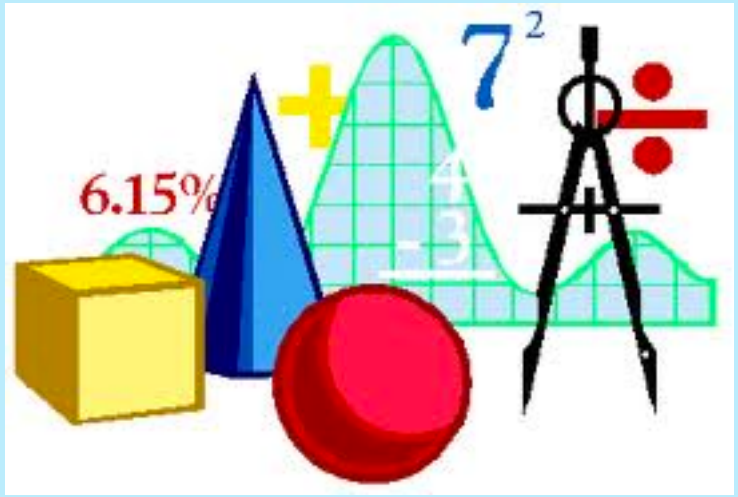
Tools for Data Analysis

Spring 2016

INTRODUCTION & DEMOGRAPHIC

- Northern Highlands Regional High School
- 9th Grade College Prep Algebra 1 course
- Unit: Linear Functions & Applications
- Class Size: 13-25 students
- Timeline: to be completed over four to five 57-minute periods

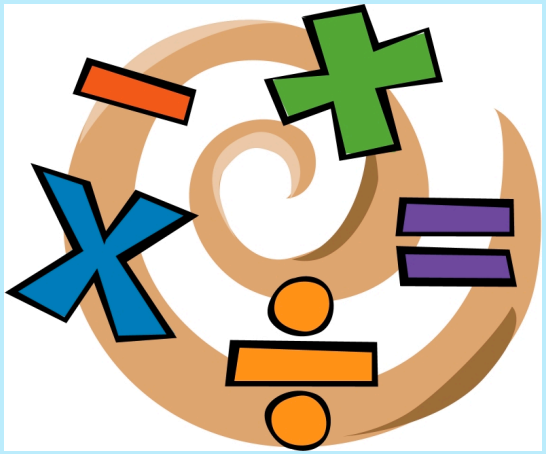


GOALS & OBJECTIVES

- Work in pairs
- Choose 2 items believed to be linearly related
- Gather data online and enter into Excel
- Use Excel to graph, analyze, and interpret the results to determine linear relationship.
- Examples include: year vs. price of candy, cost of laptop vs. online customer rating, square footage of a house vs. price, grams of fat vs. calories in food dishes, etc.
- Students will use Excel to identify whether their data follows a linear relationship and the key features of the graph.

NJCCCS

- HSF-IF.C. Analyze functions using different representations.
- HSF-LE.A. Construct and compare linear and exponential models and solve problems.
- HSF-LE.A.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.



ACTIVITIES

- **Day 1:** Brainstorm Topic & Research Data
- **Days 2-3:** Organize & Chart Data in Spreadsheet; Answer Response Questions
- **Days 3-4:** Finalize Spreadsheets & Prepare Presentations
- **Days 4-5:** Class Presentations

EXAMPLES

Men's Olympic Gold Swimming Times
100 m Freestyle

Year	Time
1906	73.40
1908	65.60
1912	63.40
1920	60.40
1924	59.00
1928	58.60
1932	58.20
1936	57.60
1948	57.30
1952	57.40
1956	55.40
1960	55.20
1964	53.40
1968	52.20
1972	51.22
1976	49.99
1980	50.40
1984	49.80
1988	48.63
1992	49.02
1996	48.74
2000	48.30
2004	48.17
2008	47.21
Average	54.94
Median	54.30
Min	47.21
Max	73.40
Range	26.19

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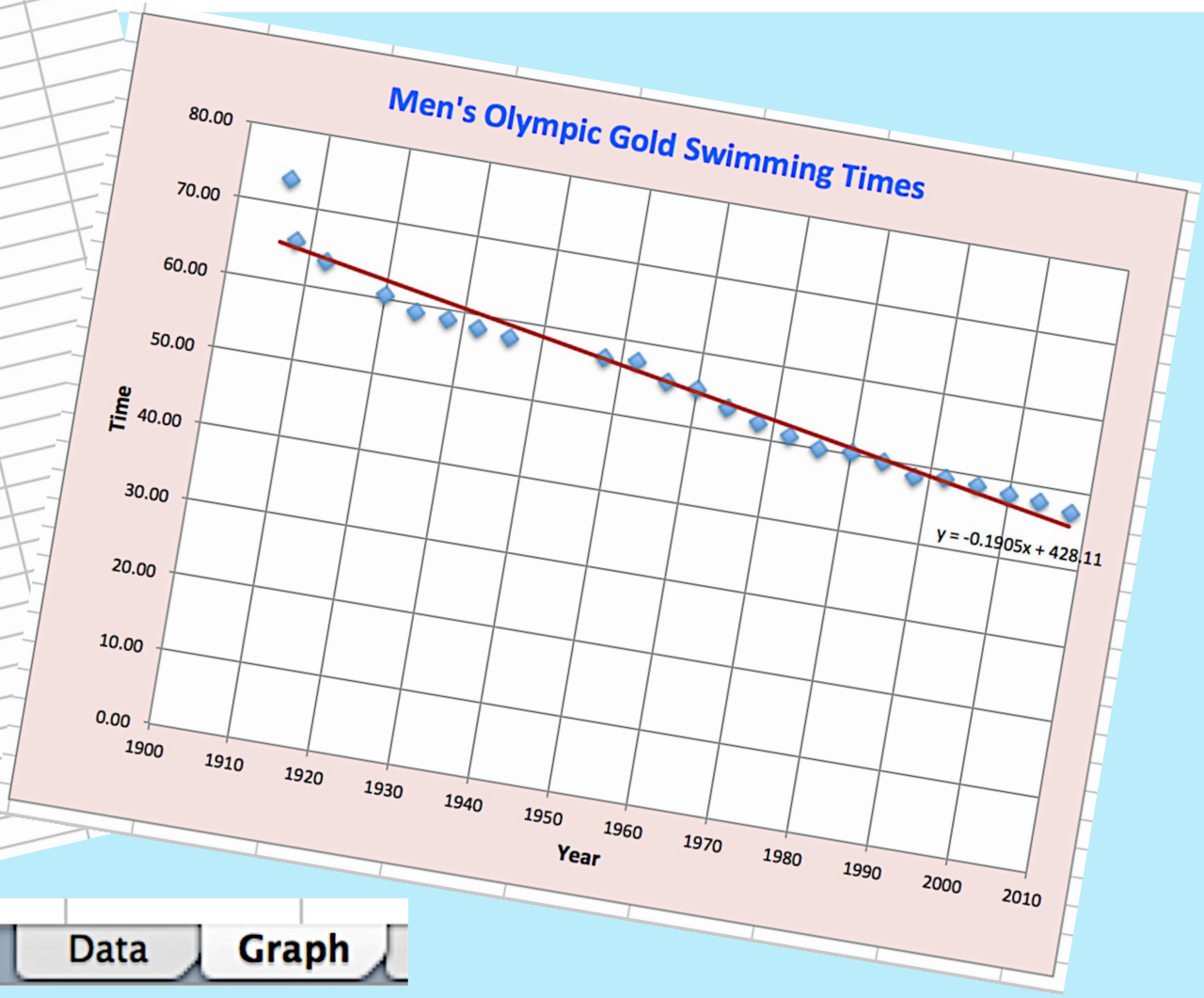


Data | Graph

SUBMISSIONS/RUBRIC

Project Submissions: *Type your answers to the following questions and number each answer. Be sure to answer all questions in complete sentences!!! (12-point font, single or double-spaced)*

1. Description of the two items that are being investigated.
2. List of 20 data points in an organized table. You can poll NHRHS students in your classes, cafeteria, hallways, etc. or use the internet to research (cite the site).
3. Identify the independent variable and the dependent variable.
4. Give the equation of best-fit line calculated by linear regression. You can use your graphing calculator or Microsoft Excel to do this.
5. Give a description of the slope in the context of the problem. *Explain* what it really means in words! Do not simply state that the slope is 3.345.
6. Give a description of the constant (y-intercept) in the context of the problem. Does the y-intercept make sense in your problem? *Explain* what it really means in words! Do not simply state that the y-int. is 2.4.
7. Graph a scatterplot of the data complete with the best-fit line and properly labeled axes.
8. Write a paragraph about your findings including: how/where you gathered your data, relationship of the data, any interesting findings, any unforeseen difficulties or questions, and changes you would make next time.

You will be given 2-3 days in class to work on your project. You will need to finish your project on your own time. On the third class day, you will give a 5-minute presentation of your findings to the class. The presentation order will be chosen randomly, so you need to be prepared to go at any time.

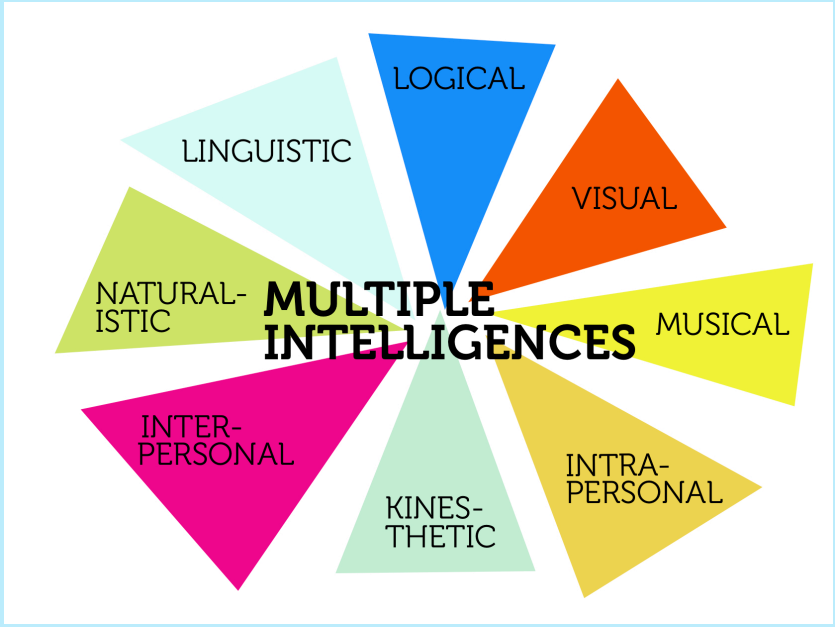
Grading

- Creativity of two items selected _____/2
- Description of two items investigated and list of data points. _____/6
- Scatter Plot and best-fit line _____/6
- All questions answered thoroughly _____/10
- Written paragraph about findings using proper English _____/8
- Presentation _____/3
- **Total** _____**/35 Points**

BRAINY BITS

- **Sense & Meaning**
  - Students will research *real* data to draw factual conclusions
  - Students will select a topic that interests them, that they feel connected to, and about which they are curious.

- **Multiple Intelligences**
  - Mathematical
  - Interpersonal
  - Visual/Spatial
  - Verbal/Linguistic
  - Existential
  - Naturalist



CITATIONS

- Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.
- Sousa, D. (2011). *How the Brain Learns* (4th ed.). Thousand Oaks, CA: Corwin Press.

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