**Session Six: Human Graphing**

**Common Core Standards Addressed**

#### Graphing on the coordinate plane is generally introduced in Grade 4 or 5. Graphing on line graphs, making sense of data, and working with two variable equations are all excellent ways to prepare students for coordinate plane graphing.

#### Grade 5

#### Graph points on the coordinate plane to solve real-world and mathematical problems.

[CCSS.Math.Content.5.G.A.1](http://www.corestandards.org/Math/Content/5/G/A/1/)  
Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).

[CCSS.Math.Content.5.G.A.2](http://www.corestandards.org/Math/Content/5/G/A/2/)  
Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

#### Grade 6

#### Represent and analyze quantitative relationships between dependent and independent variables.

[CCSS.Math.Content.6.EE.C.9](http://www.corestandards.org/Math/Content/6/EE/C/9/)  
Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.

#### Summarize and describe distributions.

[CCSS.Math.Content.6.SP.B.4](http://www.corestandards.org/Math/Content/6/SP/B/4/)  
Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

[CCSS.Math.Content.6.SP.B.5.c](http://www.corestandards.org/Math/Content/6/SP/B/5/c/)  
Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

[CCSS.Math.Content.6.SP.B.5.d](http://www.corestandards.org/Math/Content/6/SP/B/5/d/)  
Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

#### Grade 7

***Investigate chance processes and develop, use, and evaluate probability models.***

[CCSS.Math.Content.7.SP.C.8](http://www.corestandards.org/Math/Content/7/SP/C/8/)  
Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

[CCSS.Math.Content.7.SP.C.8.a](http://www.corestandards.org/Math/Content/7/SP/C/8/a/)  
Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

[CCSS.Math.Content.7.SP.C.8.b](http://www.corestandards.org/Math/Content/7/SP/C/8/b/)  
Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

[CCSS.Math.Content.7.SP.C.8.c](http://www.corestandards.org/Math/Content/7/SP/C/8/c/)  
Design and use a simulation to generate frequencies for compound events.

#### Grade 8

***Analyze and solve linear equations and pairs of simultaneous linear equations.***

Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6*.

#### Investigate patterns of association in bivariate data.

[CCSS.Math.Content.8.SP.A.1](http://www.corestandards.org/Math/Content/8/SP/A/1/)  
Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

[CCSS.Math.Content.8.SP.A.2](http://www.corestandards.org/Math/Content/8/SP/A/2/)  
Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.

[CCSS.Math.Content.8.SP.A.3](http://www.corestandards.org/Math/Content/8/SP/A/3/)  
Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height*.

[CCSS.Math.Content.8.SP.A.4](http://www.corestandards.org/Math/Content/8/SP/A/4/)  
Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

#### Use functions to model relationships between quantities.

[CCSS.Math.Content.8.F.B.4](http://www.corestandards.org/Math/Content/8/F/B/4/)  
Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

[CCSS.Math.Content.8.F.B.5](http://www.corestandards.org/Math/Content/8/F/B/5/)  
Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.