

01/16/14

EASTERN LEBANON COUNTY SCHOOL DISTRICT  
STUDENT LEARNING MAP

Course/Subject: Probability & Statistics  
Unit 1: Exploring Data: Distributions

Days: 25  
Grade Level: 11, 12





Key Learning  
**Distributions are to be displayed visually, summarized numerically, and described verbally.**



Unit Essential Question  
**How do you describe a distribution?**

<u>Concept</u> <b>Data and Variables</b>	<u>Concept</u> <b>Data, Variables, &amp; Calculators</b>	<u>Concept</u> <b>Displaying and Describing Distributions</b>
<u>Standards</u> CC.2.4.HS.B.1	<u>Standards</u> CC.2.4.HS.B.1	<u>Standards</u> CC.2.4.HS.B.1
↓	↓	↓
<u>Lesson Essential Question</u> <b>How can you describe and represent data?</b>	<u>Lesson Essential Question</u> <b>How can the graphing calculator be used to analyze data?</b>	<u>Lesson Essential Question</u> <b>How are the important features of a distribution of data used in interpreting the data?</b>
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<u>Vocabulary</u> <b>data</b> <b>variable</b> <b>variability</b> <b>observational unit (case)</b> <b>quantitative (measurement)</b> <b>qualitative (categorical)</b> <b>binary</b> <b>distribution</b> <b>frequency</b> <b>bar graph</b> <b>dotplot</b>	<u>Vocabulary</u> <b>ratio</b> <b>percentage</b> <b>rate</b>	<u>Vocabulary</u> <b>relative frequency</b> <b>symmetric</b> <b>skewed left or right</b> <b>outliers</b> <b>granularity</b> <b>stemplot</b> <b>histogram</b>

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<u>Concept</u> <b>Measures of Center</b>	<u>Concept</u> <b>Measures of Spread</b>	
<u>Standards</u> CC.2.4.HS.B.1	<u>Standards</u> CC.2.4.HS.B.1	
		
<u>Lesson Essential Question</u> <b>How are mean, median, and mode used to describe a distribution?</b>	<u>Lesson Essential Question</u> <b>How do you use the measures of center to describe a distribution?</b>	
		
<u>Vocabulary</u> <b>mean median mode resistant</b>	<u>Vocabulary</u> <b>range maximum minimum lower quartile upper quartile interquartile range percentile boxplot variance standard deviation standardized score</b>	

**Additional Information/Resources:**

- \*Workshop Statistics – Discovery with Data and the Graphing Calculator  
 Second Edition, Allan Rossman, Beth Chance, J. Barr von Oehsen
- \*TI-84 Plus Silver Edition Graphing Calculator
- \*Guided Notes

CC.2.4.HS.B.1 – Summarize, represent, and interpret data on a single count or measurement variable.

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STUDENT LEARNING MAP

Course/Subject: Probability & Statistics  
Unit 2: Exploring Data: Comparisons &  
Relationships

Days: 10  
Grade Level: 11, 12

Key Learning  
**Analyzing, Comparing, and Contrasting distributions from two or more groups simultaneously.**



Unit Essential Question  
**How do we compare two variables?**

<u>Concept</u> <b>Comparing Distributions: Quantitative Variables</b>	<u>Concept</u> <b>Comparing Distributions: Categorical Variables</b>	
<u>Standards</u> CC.2.4.HS.B.2	<u>Standards</u> CC.2.4.HS.B.2 CC.2.4.HS.B.6	
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<u>Lesson Essential Question</u> <b>How do you compare and contrast quantitative variables?</b>	<u>Lesson Essential Question</u> <b>How do you compare and contrast categorical variables?</b>	
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<u>Vocabulary</u> outliers modified boxplots statistical tendency side by side stemplots	<u>Vocabulary</u> response variable explanatory variable two-way tables marginal distributions conditional distributions segmented bar graphs Simpson's Paradox independence relative risk	

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CC.2.4.HS.B.2 – Summarize, represent, and interpret data on two categorical and quantitative variables.

CC.2.4.HS.B.6 – Use the concepts of independence and conditional probability to interpret data.

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STUDENT LEARNING MAP

Course/Subject: Probability & Statistics  
Unit 3: Exploring Data – Comparisons &  
Relationships

Days: 20  
Grade Level: 11, 12

Key Learning  
**Distributions are to be displayed visually, summarized numerically,  
and described verbally.**



Unit Essential Question  
**How do you describe a distribution?**

<u>Concept</u> <b>Graphical Displays of Association</b>	<u>Concept</u> <b>Correlation Coefficient</b>	<u>Concept</u> <b>Least Square Regression</b>
<u>Standards</u> CC.2.4.HS.B.2	<u>Standards</u> CC.2.4.HS.B.2	<u>Standards</u> CC.2.4.HS.B.2 CC.2.4.HS.B.3
↓	↓	↓
<u>Lesson Essential Question</u> <b>What is the concept of association and what are the notions of the direction and strength of association?</b>	<u>Lesson Essential Question</u> <b>What are the properties of the correlation coefficient and can you describe a real world example?</b>	<u>Lesson Essential Question</u> <b>Where do we use predictions in our lives, and how do we decide on what we are predicting?</b>
↓	↓	↓
<u>Vocabulary</u> association scatterplots paired data negative association positive association	<u>Vocabulary</u> correlation coefficient causation lurking variables confounding variables	<u>Vocabulary</u> least squares regression predictions fitted Values residuals % variability explained y-intercept slope extrapolation influential observations residual plot outliers influential observations

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CC.2.4.HS.B.2 – Summarize, represent, and interpret data on two categorical and quantitative variables.

CC.2.4.HS.B.3 – Analyze linear models to make interpretations based on the data.

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Course/Subject: Probability & Statistics  
Unit 4: Collecting Data

Days: 10  
Grade Level: 11, 12

Key Learning  
**Designing an effective study to gather data that eliminates misleading conclusions.**



Unit Essential Question  
**How can you design a study to gather data that is not biased?**

<u>Concept</u> <b>Sampling</b>	<u>Concept</u> <b>Designing Studies</b>	
<u>Standards</u> CC.2.4.HS.B.4 CC.2.4.HS.B.5	<u>Standards</u> CC.2.4.HS.B.4 CC.2.4.HS.B.5	
↓	↓	
<u>Lesson Essential Question</u> <b>How do you describe the best method for gathering data that eliminates misleading conclusions?</b>	<u>Lesson Essential Question</u> <b>How do you design an effective study with control incorporated?</b>	
↓	↓	
<u>Vocabulary</u> convenience sample voluntary response sample systematic sample simple random sample stratified random sample cluster sample population census sample representative parameter statistic biased sample sampling frame statistical inference	<u>Vocabulary</u> anecdote survey observational study experiment explanatory variable response variable cause and effect control comparison lurking variable confounding variable randomization causal relationship placebo blindness double blind blocking	

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CC.2.4.HS.B.4 – Recognize and evaluate random processes underlying statistical experiments.

CC.2.4.HS.B.5 – Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.



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Course/Subject: Probability & Statistics  
Unit 5: Randomness in Data

Days: 20  
Grade Level: 11, 12

Key Learning  
**Using models to determine probabilities.**



Unit Essential Question  
**How do you use models to calculate probabilities of events?**

<u>Concept</u> <b>Probability</b>	<u>Concept</u> <b>Normal Distributions</b>	<u>Concept</u> <b>Sampling Distributions</b>
<u>Standards</u> CC.2.4.HS.B.4 CC.2.4.HS.B.5 CC.2.4.HS.B.7	<u>Standards</u> CC.2.4.HS.B.4 CC.2.4.HS.B.7	<u>Standards</u> CC.2.4.HS.B.4 CC.2.4.HS.B.5
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<u>Lesson Essential Question</u> <b>What are the properties of probability?</b>	<u>Lesson Essential Question</u> <b>How can normal curves be use as mathematical models for approximating distributions?</b>	<u>Lesson Essential Question</u> <b>How do you determine whether a value is a parameter or a statistic and calculate its value?</b>
↓	↓	↓
<u>Vocabulary</u> <b>simulation</b> <b>random</b> <b>long term</b> <b>empirical probability</b> <b>exact probability</b> <b>sample space</b> <b>equally likely</b> <b>expected value</b> <b>binomial distribution</b>	<u>Vocabulary</u> <b>normal distribution</b> <b>bell-shaped</b> <b>mu</b> <b>sigma</b> <b>interval</b> <b>standardization</b> <b>probability model</b> <b>density curves</b> <b>critical values</b>	<u>Vocabulary</u> <b>population</b> <b>parameter</b> <b>sample</b> <b>statistic</b> <b>theta</b> <b>p-hat</b> <b>sample statistic</b>

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CC.2.4.HS.B.4 – Recognize and evaluate random processes underlying statistical experiments.

CC.2.4.HS.B.5 – Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

CC.2.4.HS.B.7 – Apply the rules of probability to compute probabilities of compound events in a uniform probability model.