



# Standard #: MAFS.912.S-ID.1.4

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Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. ★

<b>Grade:</b> 912	
<b>Cluster:</b> Summarize, represent, and interpret data on a single count or measurement variable. (Algebra 1 - Additional Cluster) (Algebra 2 - Additional Cluster) - Clusters should not be sorted from Major to Supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.	<b>Date Adopted or Revised:</b> 02/14
<b>Content Complexity Rating:</b> <a href="#">Level 2: Basic Application of Skills &amp; Concepts</a> - <a href="#">More Information</a>	<b>Date of Last Rating:</b> 02/14
<b>Status:</b> State Board Approved	

## Related Courses

Course Number	Course Title
<a href="#">1200320:</a>	Algebra 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">1200330:</a>	Algebra 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">1200340:</a>	Algebra 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">1200380:</a>	Algebra 1-B (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">1210300:</a>	Probability & Statistics with Applications Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2000350:</a>	Anatomy and Physiology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2000360:</a>	Anatomy and Physiology Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2020910:</a>	Astronomy Solar/Galactic Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2000320:</a>	Biology 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2000330:</a>	Biology 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
<a href="#">2003340:</a>	Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003350:</a>	Chemistry 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003360:</a>	Chemistry 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2001320:</a>	Earth/Space Science Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2000440:</a>	Genetics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002410:</a>	Integrated Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002430:</a>	Integrated Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002440:</a>	Integrated Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002450:</a>	Integrated Science 3 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002510:</a>	Marine Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002520:</a>	Marine Science 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2002530:</a>	Marine Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2020710:</a>	Nuclear Radiation Honors (formerly 202071A) (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003320:</a>	Physical Science Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003380:</a>	Physics 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003390:</a>	Physics 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003410:</a>	Physics 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2107310:</a>	Psychology 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">7912060:</a>	Access Informal Geometry (Specifically in versions: 2014 - 2015 (course terminated))
<a href="#">7912070:</a>	Access Liberal Arts Mathematics (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
<a href="#">7912080:</a>	Access Algebra 1A (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
<a href="#">7912090:</a>	Access Algebra 1B (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
<a href="#">7920011:</a>	Access Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
<a href="#">2002445:</a>	Integrated Science 3 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
<a href="#">2003345:</a>	Chemistry 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2003385:</a>	Physics 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
<a href="#">1200335:</a>	Algebra 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2019 (course terminated))
<a href="#">1200385:</a>	Algebra 1-B for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))

<a href="#">1207300:</a>	Liberal Arts Mathematics 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">7912065:</a>	Access Geometry (Specifically in versions: 2015 and beyond (current))
<a href="#">2100335:</a>	African-American History (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
<a href="#">2106410:</a>	Humane Letters 1 - History (Specifically in versions: 2019 and beyond (current))

## Related Resources

### Formative Assessment

Name	Description
<a href="#">Algebra Test Scores:</a>	Students are asked to select a histogram for which it would be appropriate to apply the 68-95-99.7 rule.
<a href="#">Area Under the Normal Curve:</a>	Students are asked to find the probability that an outcome of a normally distributed variable is between two given values using both a Standard Normal Distribution Table and technology.
<a href="#">Label a Normal Curve:</a>	Students are asked to scale and label a normal curve given the mean and standard deviation of a data set with a normal distribution.
<a href="#">Probability of Your Next Texting Thread:</a>	Students are asked to find the probability that an outcome of a normally distributed variable is greater than a given value.
<a href="#">Range of Texting Thread:</a>	Students are asked to find the probability that an outcome of a normally distributed variable is between two given values.

### Lesson Plan

Name	Description
<a href="#">College Freshman Entrance Data:</a>	This lesson is designed to introduce students to possible sets of normally distributed data. Students will informally assess the normality of fit. Sample data including average SAT and ACT scores and GPA's is drawn from 36 universities around the United States. First, students will be given the data in table form, and they predict why they do or do not believe their data set is normally distributed. The students will then be given the same data set as a histogram and they observe whether or not the data appears normally distributed, skewed left or skewed right. Finally, they explain their results.
<a href="#">If The Shoe Fits – A "Normal" Cinderella Story:</a>	Using a normal distribution manipulative and a calculator, students will explore the normal distribution curve to determine the area between each standard deviation from the mean using the empirical rule. Students will use the mean and standard deviation to predict outcomes in real world situations and finally answer the age old question: What size was Cinderella's glass slipper?
<a href="#">One man's success is another man's failure or How do we measure success?:</a>	Students will use the characteristics of a normal distribution to estimate population percentages and calculate the values that fall within one, two, and three standard deviations of the mean. Students are challenged to use statistics and normal distribution to determine how well a participant performed on a math competition.
<a href="#">Picturing the Normal World:</a>	This is an introductory lesson on normally distributed data. Students will collect their own height data and view the data distribution for their class. They analyze this data and decide if they are normal or not.
<a href="#">Representing Data 1: Using Frequency Graphs:</a>	This lesson unit is intended to help you assess how well students are able to use frequency graphs to identify a range of measures, make sense of this data in a real-world context, and understand that a large number of data points allow a frequency graph to be approximated by a continuous distribution.
<a href="#">Representing Data 2: Using Box Plots:</a>	This lesson unit is intended to help you assess how well students are able to interpret data using frequency graphs and box plots. In particular, this unit aims to identify and help students who have difficulty figuring out the data points and spread of data from frequency graphs and box plots. It is advisable to use the first lesson in the unit, Representing Data 1: Frequency Graphs (32498), before this one.
<a href="#">Sensing Data:</a>	In this follow up lesson, students will explore data collection using the weather station sensor and perform statistical analysis of the data. Students will use a scientific method of inquiry to plan an investigation of their own. This activity is meant to allow students to use a variety of skills they have acquired throughout a statistics unit in a personally meaningful way.
<a href="#">Sensing Data:</a>	In this follow up lesson, students will explore data collection using the weather station sensor and perform statistical analysis of the data. Students will use a scientific method of inquiry to plan an investigation of their own. This activity is meant to allow students to use a variety of skills they have acquired throughout a statistics unit in a personally meaningful way.
<a href="#">Show Me the Money! Selecting Student Athletes for Scholarships:</a>	Students will use data to decide the ideal candidate for a college scholarship by computing the mean and the standard deviation. The student will present the data using the normal distribution and make recommendations based on the findings. Students will recognize that not all data can be presented in this format.
<a href="#">Standard Deviation and the Normal Curve in Kahoot!:</a>	In this three day lesson, students learn about standard deviation, the normal curve, and how they are applied. Your students will be engaged and learning when they collect and analyze data using a free Kahoot! quiz.

### Problem-Solving Task

Name	Description
<a href="#">Do You Fit in This Car?:</a>	This task requires students to use the normal distribution as a model for a data distribution. Students must use given means and standard deviations to approximate population percentages.
<a href="#">SAT Scores:</a>	This problem solving task challenges students to answer probability questions about SAT scores, using distribution and mean to solve the problem.

[Should We Send Out a Certificate?:](#)

The purpose of this task is to have students complete normal distribution calculations and to use properties of normal distributions to draw conclusions.

#### Perspectives Video: Professional/Enthusiast

Name	Description
<a href="#">Nestle Waters &amp; Statistical Analysis:</a>	Hydrogeologist from Nestle Waters discusses the importance of statistical tests in monitoring sustainability and in maintaining consistent water quality in bottled water.
<a href="#">Normal? Non-Normal Distributions &amp; Oceanography:</a>	What does it mean to be normally distributed? What do oceanographers do when the collected data is not normally distributed?

#### Virtual Manipulative

Name	Description
<a href="#">Normal Distribution Interactive Activity:</a>	With this online tool, students adjust the standard deviation and sample size of a normal distribution to see how it will affect a histogram of that distribution. This activity allows students to explore the effect of changing the sample size in an experiment and the effect of changing the standard deviation of a normal distribution. Tabs at the top of the page provide access to supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.

#### Perspectives Video: Teaching Idea

Name	Description
<a href="#">Smile Statistics:</a>	This quantitative measurement and statistics activity will allow you to save face.

### Student Resources

Name	Description
<a href="#">Do You Fit in This Car?:</a>	This task requires students to use the normal distribution as a model for a data distribution. Students must use given means and standard deviations to approximate population percentages.
<a href="#">Normal Distribution Interactive Activity:</a>	With this online tool, students adjust the standard deviation and sample size of a normal distribution to see how it will affect a histogram of that distribution. This activity allows students to explore the effect of changing the sample size in an experiment and the effect of changing the standard deviation of a normal distribution. Tabs at the top of the page provide access to supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
<a href="#">SAT Scores:</a>	This problem solving task challenges students to answer probability questions about SAT scores, using distribution and mean to solve the problem.
<a href="#">Should We Send Out a Certificate?:</a>	The purpose of this task is to have students complete normal distribution calculations and to use properties of normal distributions to draw conclusions.

### Parent Resources

Name	Description
<a href="#">Do You Fit in This Car?:</a>	This task requires students to use the normal distribution as a model for a data distribution. Students must use given means and standard deviations to approximate population percentages.
<a href="#">SAT Scores:</a>	This problem solving task challenges students to answer probability questions about SAT scores, using distribution and mean to solve the problem.
<a href="#">Should We Send Out a Certificate?:</a>	The purpose of this task is to have students complete normal distribution calculations and to use properties of normal distributions to draw conclusions.