

Unit 08- Making Comparisons & Predictions

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **2 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students apply statistical concepts and use what they learned in Grade 6 about data analysis to further investigate distributions. The focus is on the use of measures of center and spread to describe and compare samples and populations.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Pose questions, collect data, analyze data, and interpret data to answer questions
- Choose appropriate measures of center (mean, median, or mode) and spread (range, IQR, or MAD) to summarize a sample
- Choose appropriate representations to display distributions of samples
- Compare summary statistics of multiple samples drawn from either the same population or from two different populations and explain how the samples vary
- Use the randomly generated frequencies for events to draw conclusions
- Describe the benefits and drawbacks to various sampling plans
- Use random-sampling techniques to select representative samples
- Apply concepts from probability to select random samples from populations
- Explain how sample size influences the reliability of sample statistics and resulting conclusions and predictions
- Explain how different sampling plans influence the reliability of sample statistics and resulting conclusions and predictions
- Use statistics from representative samples to draw conclusions about populations
- Use measures of center, measures of spread, and data displays from more than one random sample to compare and draw conclusions about more than one population
- Use mean and MAD, or median and IQR, from random samples to assess whether the differences in the samples are due to natural variability or due to meaningful differences in the underlying populations

Essential Questions:

- What is the relationship between a sample and a population?
- What real-life applications would involve finding the probability of an event?
- What is purpose of a simulation?

- Why would one need to use a probability model?
- What influences our decision when choosing the best graph for a data set?

Enduring Understanding:

- A survey allows you to gather data using a sample of a population and use that data to represent the population.
- Tables and graphs, as well as measures of center and variability, enable you to compare data from different samples and draw conclusions about the samples and the populations.
- Random samples are without bias, and therefore are useful for drawing conclusions about population characteristics.
- Probability models allow you to select a random sample from a population. Random samples, even of the same size, vary from each other and from the underlying population.
- You can compare two samples with approximately the same measure of variability by using that measure to determine the distance between the centers of the samples.

CONTENT AREA STANDARDS

7.SP

A. Use random sampling to draw inferences about a population

B. Draw informal comparative inferences about two populations

C. Investigate chance processes and develop, use, & evaluate probability models

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| MA.7.SP.A.1 | Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. |
| MA.7.SP.A.2 | Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. |
| MA.7.SP.B.3 | Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. |
| MA.7.SP.B.4 | Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. |
| MA.K-12.1 | Make sense of problems and persevere in solving them. |
| MA.K-12.2 | Reason abstractly and quantitatively. |

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| MA.K-12.3 | Construct viable arguments and critique the reasoning of others. |
| MA.K-12.4 | Model with mathematics. |
| MA.K-12.5 | Use appropriate tools strategically. |
| MA.K-12.6 | Attend to precision. |
| MA.K-12.7 | Look for and make use of structure. |
| MA.K-12.8 | Look for and express regularity in repeated reasoning. |

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

9.1.8.FI.4: Analyze the interest rates and fees associated with financial products.

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| WRK.K-12.P.2 | Attend to financial well-being. |
| WRK.K-12.P.5 | Utilize critical thinking to make sense of problems and persevere in solving them. |
| WRK.K-12.P.8 | Use technology to enhance productivity increase collaboration and communicate effectively. |

STUDENT LEARNING TARGETS

Declarative Knowledge

- Understand that statistics can be used to gain information about a population by examining a sample of the populations

Procedural Knowledge

Students will be able to:

- Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
- Use measures of center for numerical data from random samples to draw informal comparative inferences about two populations.
- Use measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

- Assess informally the degree of visual overlap of two numerical data distributions with similar variabilities.

EVIDENCE OF LEARNING

Benchmark Assessments

- BOY Diagnostic Snapshot Assessment
- MP1 Quarterly Assessment
- MP2 Quarterly Assessment
- MP3 Quarterly Assessment
- MP4 Quarterly Assessment
- EOY Diagnostic Snapshot Assessment

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- MathXL Assignments
- Do Now Check ins
- Formative Assessments - exit tickets, student-friendly proficiency scales, skill checklists ([Google Drive Folder](#))

Summative Assessments

- Summative Assessment [Google Drive Folder](#)
- OnCourse Assessments

RESOURCES (Instructional, Supplemental, Intervention Materials)

Instructional Materials:

- CMP3 - Samples & Populations ([Online link](#) - teacher and student resources)
- Resources for Unit 8 [Google Drive Folder](#)

Supplemental/Intervention Materials:

- Desmos - [Human Stopwatch](#), [What's My Number?](#), [Interpreting Box Plots](#)
- [MathXL](#)
- [Khan Academy](#)
- [NCTM Illuminations](#)
- [Illustrative Math](#)
- [Illustrative Math Tasks](#)

INTERDISCIPLINARY CONNECTIONS

- Statistics
- Data collection/analysis
- Computations

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.