Unpacked South Dakota State Mathematics Standards

Purpose: *In order for students to have the best chance of success, standards, assessment, curriculum resources, and instruction must be aligned in focus, coherence, and rigor. Unpacked standards documents are intended to help align instruction to the focus, coherence, and rigor of the South Dakota State Mathematics Standards. The standards have been organized in clusters as they are not so much built from topics, but rather woven out of progressions. Not all content in a given grade is emphasized equally in the mathematics standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting standards will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.*

<table>
<tr><td colspan="2">Domain: Statistics and Probability</td><td>Grade Level: 7th</td></tr>
<tr><td colspan="3">7.SP.B Cluster: Draw informal comparative inferences about two populations.

In this cluster students draw valid comparable inferences about two populations using measures of center (mean, median) and measures of variability (mean absolute deviation, interquartile range).</td></tr>
<tr><td colspan="3">**This is an ADDITIONAL cluster. Students should spend the large majority of their time (65-85%) on the major work of the grade. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.

7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, using quantitative measures of center (focusing on mean and median) and variability (interquartile range, 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. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</td></tr>
<tr><td colspan="3">Aspects of Rigor for Student Learning:(Conceptual, Procedural, and/or Application)</td></tr>
<tr><td>Conceptual Understanding</td><td>Procedural Fluency</td><td>Application</td></tr>
<tr><td><u>Note:</u> <u>Standard 7.SP.B.3 emphasizes a focus on mean and median as measures of center. Bear in mind that this does not exclude mode as a measure of center</u>

Data sets can be characterized based on measures of variability (mean absolute deviation, interquartile range) and measures of center (mean, median) (7.SP.3)

Understand that variability can create differences in the overlap of two data sets and that an increase in variability can increase these differences. (7.SP.3)

Understand that median is paired with</td><td>Find measures of center and measures of variation for two or more data sets. (7.SP.3)

Compare two data sets for variability by comparing graphs. (7.SP.3)</td><td>Make inferences about data sets by comparing their statistical measures.(7.SP.3)

Model and compare two real-world data sets by measuring the difference between centers and expressing it multiple of a measure of variability. For example, set A has an MAD of 2, while the MAD for set B is 10. Express the MAD for set B as <u>5 times the MAD of Set A.</u> (7.SP.3)</td></tr>
</table>

the interquartile range and mean is paired with the mean absolute deviation. **(7.SP.3)**		
	Draw valid comparative inferences about two populations. **(7.SP.4)**	Select the appropriate measure(s) of center (mean and median) or variability (MAD and IQR) when comparing two sets of data and justify that selection. **(7.SP.4)**

Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices

1. **Make sense of problems and persevere in solving them.**
2. **Reason abstractly and quantitatively.**
   - Students compare statistical measures on two populations..
3. **Construct viable arguments and critique the reasoning of others.**
   - Students use statistical methods as justification for predictions and inferences.
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
   - Students use statistical functions on graphing calculators for large data sets.
6. **Attend to precision.**
   - Students calculate measures of center and variability with accuracy.
7. **Look for and make use of structure.**
8. **Look for and express regularity in repeated reasoning.**

Vertical and Horizontal Coherence and Learning Progressions

Previous Learning Connections	***Current Learning Connections***	***Future Learning Connections***
In 6th grade, learners develop an understanding of graphs, mean, median, mode, Mean Absolute Deviation (M.A.D.) and interquartile range(IQR). In 6th grade, learners create dot plots, box plots and histograms. In 6th grade, learners recognize there will be variability in the data of a statistical question.and will account for it in the answers. In 6th grade, learners understand a data set has a distribution which can be described by its center, spread, and overall shape. In 6th grade, learners can summarize numerical data sets by reporting the number of observations along with describing the nature of the attribute under investigation and how it was measured and its units.	This is an additional cluster, so the connections between this cluster and other grade level clusters will limited.	In high school,learners will represent data with plots on the real number line (dot plots, histograms, and box plots). In high school, learners will use statistics appropriate to the shape and context of the data distribution to compare center (median, mean) and spread (IQR, standard deviation) of two or more different data sets. In high school, learners will interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points.

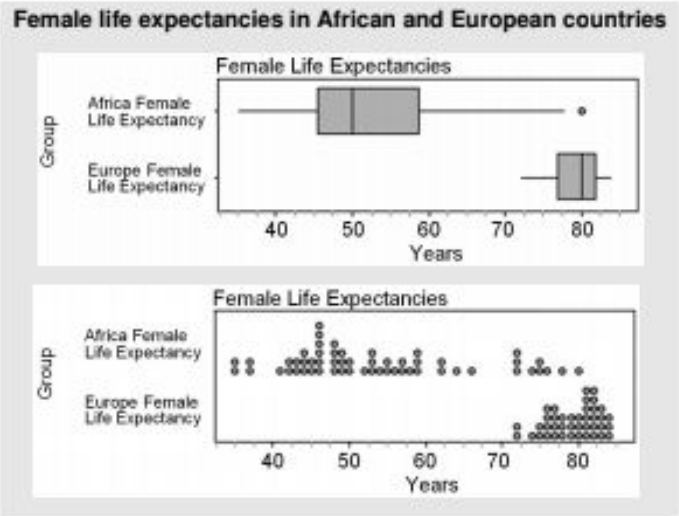
Vocabulary *(Key Terms Used by Teachers and Students in this Cluster):*

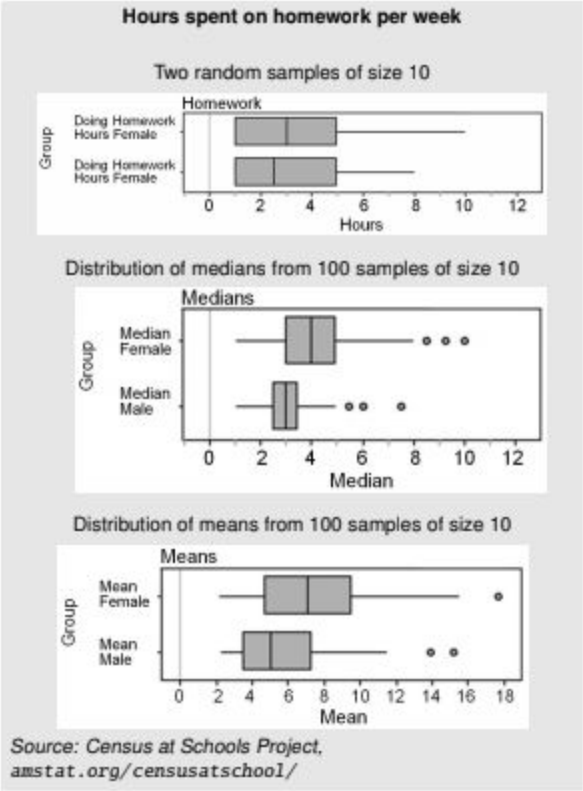
• Mean • Median	• Variability • Mean absolute deviation	• Measures of variability • Outlier

• Interquartile range • Inference	• Distribution • Measures of center	• Box plot

Relevance, Explanations, and Examples:

7.SP.3





Achievement Level Descriptors

Cluster: **Draw informal comparative inferences about two populations.**

Concepts and Procedures	***Level 1:*** Students should be able to use the mean to compare and draw inferences about two different populations.
	Level 2: Students should be able to use range to draw comparisons about two

	different populations. They should be able to informally compare the visual overlap of two numerical data distributions with similar variability in familiar contexts.
	Level 3: Students should be able to informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers in any context.
	Level 4: Students should be able to use measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.