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: Interpreting Categorical and Quantitative Data</td><td>Grade Level: Algebra 1</td></tr>
<tr><td colspan="3">A1.S.ID.C Cluster: Interpret linear models.

Interpret the rate of change (slope) and intercept (constant term) of a linear model within the context of the data.
Use technology to calculate a correlation coefficient and use it to determine the strength of fit for a best-fit function.
Determine correlation and/or causation of a relationship between variables.</td></tr>
<tr><td colspan="3">**This is a SUPPORTING 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.

A1.S.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

A1.S.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

A1.S.ID.C.9 Distinguish between correlation and causation.</td></tr>
<tr><td colspan="3">Aspects of Rigor: (Conceptual, Procedural, and/or Application)</td></tr>
<tr><td colspan="3">A1.S.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</td></tr>
<tr><td>Conceptual Understanding</td><td>Procedural Fluency</td><td>Application</td></tr>
<tr><td></td><td>Identify the rate of change.

Identify the y-intercept in a linear model.</td><td>Explain the rate of change and the y-intercept in relation to the context of the situation.</td></tr>
<tr><td colspan="3">A1.S.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.</td></tr>
<tr><td>Conceptual Understanding</td><td>Procedural Fluency</td><td>Application</td></tr>
<tr><td>Understand the correlation coefficient is a measure of how well the model fits a set of data.</td><td>Use technology to compute the correlation coefficient.</td><td></td></tr>
<tr><td colspan="3">A1.S.ID.C.9 Distinguish between correlation and causation.</td></tr>
<tr><td>Conceptual Understanding</td><td>Procedural Fluency</td><td>Application</td></tr>
<tr><td>Understand what correlation is.

Understand what causation is.</td><td></td><td>Use context to analyze a situation to determine correlation and/or causation.</td></tr>
</table>

Understand that correlation can exist without causation.		

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.**
   - Identify a situation to be causation and/or correlation.
3. **Construct viable arguments and critique the reasoning of others.**
   - Verbally justify whether two variables show causation.
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
   - Use technology to calculate correlation coefficients to determine the strength of a model.
6. **Attend to precision.**
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 middle school, learners: 1. plot points in a coordinate grid and construct an equation or a function to model the linear relationship 2. determine and interpret the slope and y-intercept 3. construct and interpret scatter plots 4. construct an equation or a function to model a linear relationship and determine/interpret the slope and y-intercept.	In Algebra 1, learners: 1. explain the slope and intercept as they relate to the context of the original problem 2. create linear functions and use them to solve problems 3. interpret key features of graphs and functions.	In future courses, learners: 1. use correlation coefficients to determine the strength of different types of best fit models 2. calculate an instantaneous and average rate of change for different types of functions and interpret them within a context.

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

- Correlation coefficient
- Causation
- Correlation

Relevance, Explanations, and Examples:

Achievement Level Descriptors

Cluster: **Interpret linear models.**

Concepts and Procedures	***Level 1:*** Students should be able to identify important quantities in the context of a familiar situation and translate words to equations or other mathematical formulation. When given the correct math tool(s), students should be able to apply the tool(s) to problems with a high degree of scaffolding.
	Level 2: Students should be able to identify important quantities in the context of an unfamiliar situation and to select tools to solve a familiar and moderately scaffolded problem or to solve a less familiar or a non-scaffolded problem with

	partial accuracy. Students should be able to provide solutions to familiar problems using an appropriate format (e.g., correct units, etc.). They should be able to interpret information and results in the context of a familiar situation.
	Level 3: Students should be able to map, display, and identify relationships, use appropriate tools strategically, and apply mathematics accurately in everyday life, society, and the workplace. They should be able to interpret information and results in the context of an unfamiliar situation.
	Level 4: Students should be able to analyze and interpret the context of an unfamiliar situation for problems of increasing complexity and solve problems with optimal solutions.