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.

Domain: Linear, Quadratic and Exponential Models	Grade Level: Algebra I

A1.F.LE.B Cluster: Interpret expressions for functions in terms of the situation they model.

Interpret key features of a linear and exponential function in terms of the contextual situation they model.

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.F.LE.B.5 Interpret the parameters in a linear or exponential function in terms of a context. *

Aspects of Rigor: (Conceptual, Procedural, and/or Application)

A1.F.LE.B.5 Interpret the parameters in a linear or exponential function in terms of a context. *

Conceptual Understanding	*Procedural Fluency*	*Application*
Understand the key features of linear and exponential functions.		Determine and explain the meaning of slope, y-intercept, domain, and range in a contextual situation or graph. Determine and explain the meaning of growth/decay factor, y-intercept, domain, range, and end behavior in a contextual situation or graph.

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.**
   - Interpret key features of linear and exponential functions and explain their relevance in context.
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
6. **Attend to precision.**
7. **Look for and make use of structure.**
   - Identify key features in a contextual situation or graph of a linear or exponential relationship.
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. understand slope is a rate of	In Algebra 1, learners: 1. use paper and pencil,	In future math courses, learners: 1. will extend their analysis to

change expressed as the ratio of rise over run for any two distinct points on the same line 2. relate the information gathered by the ratio of rise over run to the linear equation and understand that a change in slope will cause the line to become more or less steep 3. simplify exponential expressions using the Rules of Exponents.	graphing calculators, graphing programs, spreadsheets, or other graphing technologies to model and interpret parameters in linear, quadratic, or exponential functions. Parameters may include slope, y-intercept, base value, and vertical shifts 2. study functions to develop contextual understanding on parameter changes in linear and exponential function situations.	different types of functions and interpret the key features in modeling situations.

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

- end behavior

Relevance, Explanations, and Examples:

Achievement Level Descriptors

Cluster: **Interpret expressions for functions in terms of the situation they model.**

Concepts and Procedures	**Level 1:** Students should be able to interpret linear functions in context, and given the key features of a linear graph, they should be able to identify the appropriate graph.
	Level 2: Students should be able to interpret exponential functions in two variables in context of the situation, and given the key features of a graph of a linear or exponential function, they should be able to identify the appropriate graph. Students should be able to specify the average rate of change from an equation of a linear function and approximate it from a graph of a linear function.
	Level 3: Students should be able to graph linear and exponential functions and interpret and relate key features, including range and domain, in familiar or scaffolded contexts. They should be able to specify the average rate of change of a function on a given domain from its equation or approximate the average rate of change of a function from its graph.
	Level 4: Students should be able to interpret complex key features such as end behaviors of graphs and functions in unfamiliar problems or contexts.