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: Algebra	**Grade Level: Algebra 2**

A2.A.SSE.A Cluster: Interpret the structure of expressions

Learners use different forms of algebraic expressions to solve problems.
They also use quantitative reasoning to recognize patterns and understand relationships among different expressions.
Learners are expected to see how the structure of an algebraic expression reveals properties of the function it defines.

This is a MAJOR 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.*

A2.A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (Uses Modeling)
- **a. Interpret parts of an expression, such as terms, factors, and coefficients.**
- **b. Interpret complicated expressions by viewing one or more of their parts as a single entity in context.**

A2.A.SSE.A.2 Recognize and use the structure of an expression to identify ways to rewrite it.

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

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Conceptual Understanding	***Procedural Fluency***	***Application***
Learners are able to look at a non-linear expression and understand and breakdown an expression into key parts (terms, factors, coefficients).		Learners are able to model real world situations using non-linear expressions. For example, model volume as a function. These expressions can be in equivalent forms (standard form, factored form, etc.).

A2.A.SSE.A.2 Recognize and use the structure of an expression to identify ways to rewrite it.

Conceptual Understanding	***Procedural Fluency***	***Application***
Learners are able to recognize when expressions are equivalent.	Learners are able to rewrite expressions in alternate forms. Examples: factoring, completing the square, simplifying logarithmic and exponential expressions, and	Learners are able to identify which form of an expression is useful given a certain context. Example:$x^3 + 2x^2 - 5x - 6$versus the factored form: $(x + 3)(x - 2)(x + 1)$

	performing operations (add/subtract/multiply/divide) with polynomials.	

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 will be able to explain in their own words how specific structures are seen in different expressions.
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
   - Students will be able to write non-linear expressions given real world problems.
5. **Use appropriate tools strategically.**
   - Students will be able to determine which method or form of an expression would be most appropriate to use given the context of the problem.
6. **Attend to precision.**
7. **Look for and make use of structure.**
   - Students will be able to write expressions using structure to identify important components of the expression (where zeros may occur or end behavior).
   - Students will be able to identify individual parts of an expression as a single entity to make use of the structure of the expression.
8. **Look for and express regularity in repeated reasoning.**
   - Students are expected to move from repeated reasoning, such as using exponents to rewrite repeated multiplication with variables and numbers.

Vertical and Horizontal Coherence and Learning Progressions

Previous Learning Connections	***Current Learning Connections***	***Future Learning Connections***
Expressions learned in previous math courses are linear, quadratic and exponential.	*Expressions are the foundation of functions, which is the major theme of Algebra 2. This course builds upon the expressions learned in Algebra 1 and extends it to higher degree polynomial, logarithmic, square root, and rational expressions.*	*Expressions learned in future math courses build upon the expressions learned in Algebra 2 and extend to trigonometric and matrix expressions.*

Vocabulary (key terms and definitions)

- Coefficient
- Degree
- Distributive Property of Addition over Multiplication
- End Behavior
- Equivalent Expressions
- Equation
- Exponent
- Expression
- Factor
- Leading Coefficient
- Maximum
- Minimum
- Polynomial
- Term
- Zero of a Function

Relevance, Explanations, and Examples:

Achievement Level Descriptors

Cluster: Interpret the structure of expressions

Concepts and Procedures	***Level 1:*** Students should be able to identify parts of an expression, such as terms, factors, coefficients, exponents, etc.
	Level 2: Students should be able to interpret parts of an expression, such as terms, factors, coefficients, exponents, etc., and interpret simple compound expressions by viewing one or more of their parts as a single entity. They should also be able to recognize equivalent forms of linear expressions.
	Level 3: Students should be able to recognize equivalent forms of expressions and use the structure of an expression to identify ways to rewrite it. They should be able to interpret complicated expressions by viewing one or more of their parts as a single entity.
	Level 4: Students should be able to look for and use structure and repeated reasoning to make generalizations about the possible equivalent forms expressions can have, e.g., a quadratic expression can always be represented as the product of two factors containing its roots.