

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: Statistics and Probability		Grade Level: 7th
7.SP.A Cluster: Use random sampling to draw inferences about a population.		
Students learn about sampling populations and that a sampling must be representative of the population in order to make valid inferences and generalizations. To measure variation and estimates or predictions about a characteristic, students must conduct multiple samples of the same size from populations with an unknown characteristics.		
<p>**This is a SUPPORTING cluster. <i>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.</i></p> <p>7.SP.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.</p> <p>7.SP.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. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p>		
Aspects of Rigor for Student Learning: (Conceptual, Procedural, and/or Application)		
Conceptual Understanding	Procedural Fluency	Application
<p>Understand that a random sample can be used to represent the total population and will generate valid results. (7.SP.1)</p> <p>Understand that a random sample must be used that accurately represents the population. For example, a random sample of elementary students should not be used to make generalizations about the prom. (7.SP.1)</p> <p>Identify factors that might create bias. (7.SP.1)</p>		

<p>Understand information from a random sample can be used to make inferences about an entire population. (7.SP.2)</p>	<p>Use a sample to make an inference. (7.SP.2)</p> <p>Devise a means for collecting a random sample to respond to a statistical question. (7.SP.2)</p>	<p>Use data from a random sample to generalize features of the population from which the sample was selected. (7.SP.2)</p> <p>Use a sample to make an inference, then explore the variation in estimates or predictions based on multiple samples from the same data. (7.SP.2)</p>
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Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices

1. **Make sense of problems and persevere in solving them.**
 - Students understand validity of data collected/provide.
2. **Reason abstractly and quantitatively.**
 - Students make generalizations and predictions based on random samples.
3. **Construct viable arguments and critique the reasoning of others.**
 - Students use statistical methods as justification for predictions and inferences.
4. **Model with mathematics.**
 - Students develop probability models and use them to find probabilities of events.
5. **Use appropriate tools strategically.**
 - Students use organized lists, tables, and simulation tools.
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

<u>Previous Learning Connections</u>	<u>Current Learning Connections</u>	<u>Future Learning Connections</u>
<p>In 6th grade, learners summarize quantitative data using quantitative measures of center and variability.</p>	<p>In 7th grade, learners focus on the process of selecting a random sample, and the value of doing so.</p>	<p>In high school, learners make inferences and justify conclusions from sample surveys, experiments, and observational studies.</p>

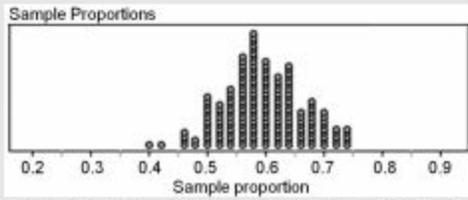
Vocabulary (Key Terms Used by Teachers and Students in this Cluster):

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| <ul style="list-style-type: none"> • Inference • Valid • Sample | <ul style="list-style-type: none"> • Random sample • Representative sample • Population |
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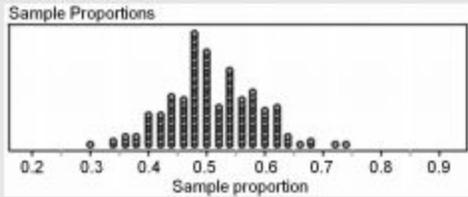
Relevance, Explanations, and Examples:

7.SP.2

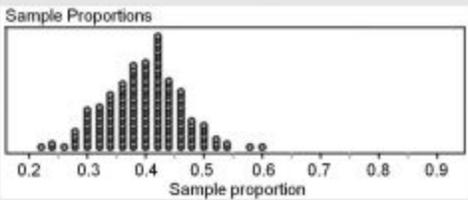
Results of simulations



Proportions of red chips in 200 random samples of size 50 from a population in which 60% of the chips are red.



Proportions of red chips in 200 random samples of size 50 from a population in which 50% of the chips are red.



Proportions of red chips in 200 random samples of size 50 from a population in which 40% of the chips are red.

Achievement Level Descriptors

Cluster: Use random sampling to draw inferences about a population.

Concepts and Procedures

Level 1: Level 1 students should be able to describe what a representative sample entails and identify biased and unbiased samples of a population.

Level 2: Level 2 students should be able to determine whether or not a sample is random and understand that random samples of an appropriate population are representative samples that support valid results. They should be able to use data from a random sample to draw obvious inferences about a population presented in a familiar context.

Level 3: Level 3 students should be able to use data from a random sample to draw inferences about a population with an unknown characteristic of interest presented in an unfamiliar context.

Level 4: Level 4 students should be able to generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.