

# Common Core State Standards for Mathematics Met by Data Modeling Activities

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
<p>Taking Measurements <i>Arm span</i> <b>6th:</b> SP.1</p>	<p>Measuring Center <i>Inventing</i> <b>6th:</b> SP.2, SP.3, SP.5abcd</p>	<p>Measuring Precision <i>Inventing</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd</p>	<p>Take New Measure <i>Arm span with meter stick</i> <b>6th:</b> SP.1, SP.2, SP.3, SP.4, SP.5abcd</p>	<p>Exploring Expectation <i>Sneaky Pete, Mystery Spinner</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> R.2a, SP.1, SP.2, SP.5</p>	<p>Modeling True Measure <i>Building models of arms span</i> <b>6th:</b> NS.5, SP.1, SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> RP.2a, SP.1, SP.2, SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>	<p>Measurement: Same Person? Improvement in Method? <b>6th:</b> NS.5, SP.1, SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>
<p>Inventing Displays <i>shape, bins, order, scale, count</i> <b>5th:</b> MD.1, MD.2; <b>6th:</b> SP.1, SP.2, NS.7</p>	<p>Comparing Methods <i>Center</i> <b>6th:</b> SP.2, SP.3, SP.5abcd</p>	<p>Comparing Methods <i>Spread</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd</p>	<p>Comparing Distributions <b>6th:</b> NS.5, SP.2, SP.3, SP.4, SP.5abcd</p>	<p>Investigating Sampling <i>red/blue spinners, TinkerPlots</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> R.2a, SP.1, SP.2, SP.5, SP.6, Sp.7</p>	<p>Identifying sources of Variability <i>Laps/gaps, counting error, etc.</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> RP.2a, NS.1a, SP.1, SP.2, SP.3, SP.4, SP.5, SP.6, Sp.7, SP.8</p>	<p>The Power of Illusion <i>Eye Illusion (Mueller)</i> <b>6th:</b> NS.5, SP.1, SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>
<p>Comparing Displays <i>Distinguish what each display</i> <b>6th:</b> SP.1, SP.2, SP.4, SP.5ab</p>	<p><i>M&amp;Ms, paper folding, etc.</i> <b>6th:</b> SP.2, SP.3, SP.5abcd, NS.2, NS.3, NS.5</p>	<p>Exploring Traditional Measures of Precision <i>MAD, IQR, Range</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd, RP.3c, NS.2, NS.3, NS.5, NS7c</p>	<p>Trying out Statistics <b>6th:</b> NS.5, SP.1, SP.2, SP.3, SP.4, SP.5abcd</p>	<p>Investigating Compound Probability <i>Two spinners, dice</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> R.2a, SP.1, SP.2, SP.5, SP.6, SP.7, SP.8</p>	<p>Modeling Measurement by combining chance devices <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.1, SP.2, SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>	<p>Home Run King <b>6th:</b> NS.5, SP.1, SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>
<p>Formative Assessment <i>Jump rope, statue</i> <b>6th:</b> SP.1, SP.2, SP.4, SP.5ab</p>	<p><i>Exercise ball, swimming strokes</i> <b>6th:</b> SP.2, SP.3, SP.5abcd</p>	<p>Formative Assessment <i>Leah and Mark, Water Treatment</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd</p>	<p>Production Process <i>Toothpick/Candy Factories/Rate Walk</i> <b>6th:</b> NS.5, SP.1, Sp.2, SP.3, Sp.4, SP.5abcd</p>	<p>Investigating Sampling Distributions <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> R.2a, SP.1, SP.2, SP.5, SP.6, SP.7, SP.8</p>	<p>Model Fit <i>Informal inference</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.1, SP.2, SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>	<p>Formative Assessment <i>Birth Rates, Pumpkins</i> <b>6th:</b> NS.5, SP.1, SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p>
<p><b>Bridging Concepts:</b> Bridging between CCSSM standards and important mathematical foundations of these standards, DM Unit 1 unpacks the meaning of the shape of the distribution. The choices that designers of representations make about how to structure data, for example, by ordering and counting case values, determines the shape of the data. Unit 1 activities also highlight the correspondence between a repeated process, here represented by repeated measure of the length of an attribute and the variability of outcomes that result from repetitions of this measurement process.</p>	<p><b>Bridging Concepts:</b> A general misconception about measures of central tendency views them as obligatory procedural steps in dealing with data, rather than viewing statistics as true measurement tools, like a ruler or thermometer. CCSSM implicitly treats statistics as measures. To highlight statistics as measures, DM immerses students in inventing measures of center as estimates of the true measure of the attribute measured in Unit 1.</p>	<p><b>Bridging Concepts:</b> Measures of variability are rarely understood as measurements. By student invention and by whole-class conversation where the viability of student inventions are considered, statistics of variability are developed as measures, rather than as obligatory procedural steps. Variability of repeated measure represents error in measurement, a critical concept in social and natural sciences.</p>	<p><b>Bridging Concepts:</b> Generalization is an important mathematical practice. Unit 4 re-contextualizes measures of center and of variability in production processes, such as toothpick and candy factories, and rate-walks. This promotes generalization because measures of center now correspond to target values of production processes rather than to true measure of attributes. Measures of variability now refer to consistency of product rather than precision of measure.</p>	<p>Formative Assessment <i>Smart mice, carnival shirt buttons</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> R.2a, SP.1, SP.2, SP.5, SP.6, SP.7, SP.8</p> <p><b>Bridging Concepts:</b> The CCSSM standards promote sample-to-sample variability but do not relate these to concepts of distribution and statistic. DM addresses this gap by introducing the distribution of sample statistics--the sampling distribution--where measurements of center and variability now take on new meaning, again promoting the mathematical practice of generalization.</p>	<p>Model extensions <i>Bad Model</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.1, SP.2, SP.3, SP.4, SP.5, SP.6, SP.7, SP.8</p> <p>Formative Assessment <i>Angeline's Cookies</i> <b>6th:</b> SP.2, SP.3, SP.4, SP.5abcd; <b>7th:</b> SP.1, SP.2, SP.5, SP.6, SP.7, SP.8</p> <p><b>Bridging Concepts:</b> Statisticians make inferences by constructing models of random processes. DM engages students in the process of building models by analyzing sources of random variability in now-familiar processes of repeated measure and production. The CCSSM tacitly endorse this component of statistical reasoning but do not make it explicit.</p>	<p><b>Bridging Concepts:</b> Statisticians make inferences by modeling chance processes. In Unit 7, students use their models of measure and production processes developed in Unit 6, and the idea of sampling distribution introduced in Unit 5, to make informed statistical inferences. Students extend modeling and inference to contexts of natural variation, so that statistical reasoning now encompasses a variety of contexts and situations involving chance.</p>