

## Core Content

<b>Cluster Title: Understand and evaluate random processes underlying statistical experiments.</b>
<b>Standard S.IC.1:</b> Understand that statistics allows inferences to be made about population parameters based on a random sample from that population.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>Understand the importance of randomness in obtaining a representative sample from a population.</li> <li>Use randomly collected data to make an inference about a population.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>Giving quantitative measures of center and variability (6.SP.5c).</li> <li>Using graphical and numerical summaries from random samples to draw inferences about a population (7.SP.1,2,4)</li> <li>Finding and interpreting standard deviations (I.S.ID.2)</li> </ul>	
<b>Academic Vocabulary</b>	
inference, parameter, population, statistic, sample, random, variability, standard deviation	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>Use applications such as estimating the number of fish in a lake or the prevalence of a disease or trait in a population to explore ways to collect random samples and make inferences.</li> </ul>	<ul style="list-style-type: none"> <li>Statistics &amp; Probability S-IC: “Why Randomize?” <a href="http://www.illustrativemathematics.org/standards/hs">http://www.illustrativemathematics.org/standards/hs</a></li> </ul>
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-Based Task:</b> Do students like school lunch? Explain why selecting the first 10 people in the lunch line is not a representative sample of the opinions of students. Describe a process for selecting a representative sample.	<b>Problem Task:</b> Find a question of interest about the school population. Collect a random sample about the question of interest. Determine what inferences can be made about the population from that sample. For example: How many pairs of shoes does a typical student own?

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<b>Standard S.IC.2:</b> Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. <i>For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of five tails in a row cause you to question the model?</i>
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Design a model to simulate random outcomes using dice, coins, cards, or technology.</li> <li>• Evaluate the results of a simulation to determine if the model is consistent with the results of the simulation.</li> <li>• Use the Law of Large Numbers to understand the relationship between theoretical and experimental probability.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Understanding probabilities as chance events and approximate probabilities using experiments (7.SP.5, 6)</li> <li>• Simulating random outcomes, and determine the probabilities of the outcomes based on the results of the simulations (II.S.MD.+6, III.S.MD.6)</li> </ul>	
<b>Academic Vocabulary</b>	
simulation, probability model, random selection.	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Suppose a typical driver is in an accident every five years. Make a small paper bag with 20 beans for each student, each with a different ratio of black and white beans. The black beans represent a car accident. Without looking in the bags, have all students sample with replacement 20 times, counting how many car accidents that they had. Does their bag represent a typical driver? Discuss their decision and compare data.</li> </ul>	<ul style="list-style-type: none"> <li>• Simulation Applets at <a href="http://nlvm.usu.edu">http://nlvm.usu.edu</a></li> <li>• Statistics Applets at <a href="http://www.math.usu.edu/~schneit/CTIS/">www.math.usu.edu/~schneit/CTIS/</a></li> </ul>
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-Based Task:</b> The local newspaper randomly selects 10 students for an interview about the school dress code. Nine of the students are boys. Does the number of boys selected cause you to question the selection process?	<b>Problem Task:</b> Create a model for obtaining a sample and defend why the model will generate consistent results.