Sampling techniques explored through Jelly Blubbers

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Reference: http://wikis.lib.ncsu.edu/images/9/97/Jellyblubber.pdf

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Overview of lesson
The purpose of this lesson is to allow students to see how sampling techniques eliminate bias and to explore some of the basic types of random sampling.

CCSS
CCSS.Math.Content.6.sp.a.1

CCSS.Math.Content.6.sp.b.4

CCSS.Math.Content.7.sp.a.1

CCSS.Math.Content.6.sp.a.2

Prerequisites
Students should have prior knowledge of creating histograms or dotplots as well as how to read the results of a die roll or some other method for generating a random number from 1-100. They should know how to find the median, mean and range of a data set and compute an average.

Learning targets
Students will be asked to determine which sampling technique appeared to make the best estimate and reduced bias as well as variation.

Time required
Approximately one class period.

Materials required

Jelly blubber colony handouts and percentile dice or some other random number generator so the students can select numbers from 1-100

Lesson Details

Begin the lesson by asking the students to find the average length of the jelly blubbers by picking 5 blubbers that they believe best represent the "typical" jelly blubber. Remind the students they are the jelly blubber experts and they should be able to pick the representative sample using their own expertise. The students will pick their sample of 5 and find the actual length of the jelly blubbers from the list with the lengths provided.

Now graph their averages using a dot plot and ask the students to discuss the sampling distribution by describing the shape, outliers, center and spread . (SOCS) Remind the students they are trying to estimate what the population parameter is for the colony. You can never emphasize too often what they are trying to find because they will forget!

Now repeat the process for each of the other sampling designs and ask the students to compare and contrast the distributions of their sample means that you graphed. The directions for each design are on the handout. Your method of picking the random sample will vary depending on what you are using for picking your random numbers. As you work through each design you will notice that the judgmental sample is significantly shifted to the higher values as the students will typically pick larger jelly blubbers than the true average as a "typical" blubber. Ask the students again after each distribution what they were trying to estimate. After you get done with the final distribution do a final comparison of the graphs. Ask the students now what they see. You should emphasize the shapes are very similar and the centers are similar since

the last 4 techniques should give an unbiased estimate for mu. A discussion of why the

variation of the stratified sample was so much less than the variation in the other samples

would also be in order.