Which cookie has the most chips?

Is there a difference in the number of chocolate chips in Chips Ahoy cookies versus the number of chocolate chips in Hy-Vee Chip-A-Roo brand cookies? Each pair of students will count the number of chocolate chips in 1 Chips Ahoy cookie and 1 Hy-Vee Chip-A-Roo. Due to the factories processes, we can assume the population distributions of # of chips are approximately normal and that the samples are random.

1. Record the number of chocolate chips in each cookie. Write them on the board.

   \# in Chips Ahoy = \_
   \# in Hy-Vee Chip-A-Roo = \_

2. Find the mean number of chocolate chips for each type of cookie, the standard deviation and the difference.

   Chips Ahoy: $\bar{x}_1 =$
   Hy-Vee Chip-A-Roo: $\bar{x}_2 =$
   Difference: $\bar{x}_1 - \bar{x}_2 =$

   $s_1 =
   s_2 =$

3. If we repeated this process many times and created a dotplot, we would have the sampling distribution of $\bar{x}_1 - \bar{x}_2$. Describe the shape, center and spread of the sampling distribution.

   Shape:
   Center:
   Spread:

4. Have the conditions for constructing a confidence interval been met? Explain.

5. Construct a 95% confidence interval for the true difference in the mean number of chocolate chips in Chips Ahoy and Hy-Vee Chip-A-Roo.

6. Do we have evidence that there is a difference in the average number of chocolate chips in a Chips Ahoy and a Hy-Vee Chip-A-Roo cookie?
Check Your Understanding

Mr. Wilcox’s class performed an experiment to investigate whether drinking a caffeinated beverage would increase pulse rates. Twenty students in the class volunteered to take part in the experiment. All of the students measured their initial pulse rates (in beats per minute). Then Mr. Wilcox randomly assigned the students into two groups of 10. Each student in the first group drank 12 ounces of cola with caffeine. Each student in the second group drank 12 ounces of caffeine-free cola. All students then measured their pulse rates again. The table displays the change in pulse rate for the students in both groups.

<table>
<thead>
<tr>
<th>Change in pulse rate (Final pulse rate — Initial pulse rate)</th>
<th>Mean change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine 8 3 5 1 4 0 6 1 4 0</td>
<td>3.2</td>
</tr>
<tr>
<td>No caffeine 3 -2 4 -1 5 5 1 2 -1 4</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Construct and interpret a 95% confidence interval for the difference in true mean change in pulse rate for subjects like these who drink caffeine versus who drink no caffeine.