The Great Probability Challenge
Essential Learning Outcomes and Objectives

<table>
<tr><th colspan="2">Desired Results</th></tr>
<tr><td colspan="2">Established Goals:
Students will relate statistics and probability to real world experiences.
Students use technology tools and resources to make informed decisions.

California Mathematics Content Standards Grade 4
4 [S] Statistics, Data Analysis, and Probability
4 [S.1.0] Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings:
4 [S.1.1] Formulate survey questions; systematically collect and represent data on a number line; and coordinate graphs, tables, and charts.
4 [S.2.0] Students make predictions for simple probability situations:
4 [S.2.2] Express outcomes of experimental probability situations verbally and numerically

NETS for Students
[4] Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources.
[4.c] collect and analyze data to identify solutions and/or make informed decisions.</td></tr>
<tr><td>Understandings:
Students will understand that:
1. Graphs can be used to visually represent and communicate information and data.
2. The concepts of probability and statistics.
3. Probability and statistics can be experienced in their everyday lives.</td><td>Essential Questions:
1. How does mathematical probability work?
2. What are the best ways to represent probability?
3. How can probability and statistics be visually communicated?
4. Where do we see laws of statistics and probability in everyday life?</td></tr>
<tr><td>Students will know:
1. Grade level appropriate terminology of statistics and probability.
2. That the size of the data sample influences the outcome of the experiment.
3. That larger data samples produce more accurate results.</td><td>Students will be able to:
1. Systematically gather and analyze data
2. Visually communicate data to tell a story.
3. Find everyday examples of statistics and probability and use proper terminology to introduce their findings to others.</td></tr>
<tr><th colspan="2">Assessment Evidence</th></tr>
<tr><td>Performance Tasks:
• Students predict outcomes and perform coin toss experiment and record their data.
• Students create a graph to visually represent the data from their coin toss experiment.
• In small groups students compare and find averages for their results
• Students gather data from the Great Coin Toss Project Database to expand their data sample.
• Students analyze 100 and 1000 coin flips, create graphs, analyze and compare their findings.
• Students visually display, share and compare their data in the Probability Blog
• Students author a task in which they see probability in their daily lives. They use real live examples and share them in a small group.
• Students share their project experiences in the Probability Blog.</td><td>Other Evidence:
• Students create and properly label graphs representing the results from their coin toss experiment and present their findings in their Probability Workbook.
• Students use the project rubric to self-assess their work.
• Teacher will evaluate Probability Workbook through rubric.
• Students share their authored tasks in small groups.
• Students gather probability data from their daily lives and share their own data with the class.</td></tr>
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