

Rubric: Blocks in a Bag

Key APS Mathematics Performance Standards: Kindergarten

- ☞ **Describes** patterns in nature and daily routines.
- ☞ **Makes** predictions based on familiar situations and **relates** to the concept of chance (e.g., Will it rain on a sunny day?).
- ☞ **Uses** probability terms such as “likely” and “unlikely”.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Novice	<ul style="list-style-type: none"> ❖ The student understands (Done as a class) ... <ul style="list-style-type: none"> • That s/he needs to predict the color that will be pulled from the bag. ❖ The student does not understand... <ul style="list-style-type: none"> • That s/he needs to conduct an experiment to prove (disprove) their prediction. • The need to record his/her results of the experiment or any math thinking for their prediction. • That s/he needs to describe the outcome of the experiment. 	<ul style="list-style-type: none"> ❖ The student participates with the class by predicting which color block will be pulled from the bag, but cannot follow the experiment to prove his/her results. ❖ The student needs to develop a concept of what would be a likely or unlikely outcome. <p>Sample Strategies: The student draws pictures of the blocks and may even predict that the red block will be the one to be pulled, however there is no math evidence supporting their predictions.</p>	<ul style="list-style-type: none"> ❖ There is little or no communication, the student did not label the work and/or their thinking is difficult to follow. ❖ Summary: The student cannot write or verbalize his/her final answer, and/or little or no math language and symbols to explain (verbally or in writing) how s/he predicted and proved what color the block would be when pulled from the bag. ❖ Representations: The student has no system (charts/tables/graphs) to track the results of their experimental probability experiment.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Apprentice	<p>❖ The student understands (Done as a class) ...</p> <ul style="list-style-type: none"> • That s/he needs to predict the color that will be pulled from the bag. • That s/he needs to conduct an experiment by pulling blocks out of the bag to 'prove' (disprove) his/her prediction. <p>❖ The student may not understand...</p> <ul style="list-style-type: none"> • How to use the results from the experiment to prove (disprove) his/her predictions. • How to describe the outcome of the experiment using the terms likely or unlikely. 	<p>❖ The student participates with the class by predicting which color block will be pulled from the bag and conducting the experiment; however the student does not have enough understanding of the experiment to interpret the results.</p> <p>❖ The student is developing the concept of probability and will use some math language or thinking to prove or disprove their prediction.</p> <p>Sample Strategy: The student helps the class conduct the experiment by pulling out blocks but does not understand enough about the results to determine what color is the most likely color to be pulled.</p>	<p>❖ The student has communicated his/her answer to the task by labeling their work, but the task is not clearly organized and the student's thinking is hard to follow.</p> <p>❖ Summary: The student states his/her final answer, and uses some math language and symbols to explain (verbally or in writing) how s/he predicted and proved what color the block would be when pulled from the bag.</p> <p>❖ Representations: The student can represent the colored blocks, but has not established an accurate system (charts/tables/graphs) to track the results of their experimental probability experiment.</p>
Practitioner	<p>Proficiency</p> <p>❖ The student understands that s/he must (Done as a class)...</p> <ul style="list-style-type: none"> • Predict which color the block will be pulled from the bag. • Conduct an experiment by pulling blocks out of the bag to prove or disprove his/her prediction. • Interpret the results of the experiment. • Describe the outcome of the experiment using the terms likely or unlikely. 	<p>Proficiency</p> <p>❖ The student participates with the class by predicting which color block will be pulled from the bag, conducts an experiment, and uses the information from the experiment to prove or disprove his/her prediction.</p> <p>Sample Strategy: The student predicts that the red block will be pulled the most, conducts the experiment with the class and interprets the results. The student states that his/her prediction was right because there are more red blocks to choose from, so it is more likely to choose a red block.</p>	<p>Proficiency</p> <p>❖ The student can represent his/her work in a clear, organized manner.</p> <p>❖ Summary: The student states his/her final answer and uses appropriate math language and symbols to explain (verbally or in writing) how s/he predicted and proved what color the block would be when pulled from the bag.</p> <p>❖ Representations: The student can represent the colored blocks and has established an accurate system (charts/tables/graphs) to track the results of their experimental probability experiment.</p>

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
<p>Expert</p>	<p>❖ The student understands that s/he must (Done as a class)...</p> <ul style="list-style-type: none"> • Predict which color the block will be pulled from the bag. • Conduct an experiment by pulling blocks out of the bag to prove or disprove his/her prediction. • Interpret the results of the experiment. • Describe the outcome of the experiment using the terms likely or unlikely. <p>❖ Task Extension: The student includes a rule, equation, generalization, and/or observation (verbal or written) about their understanding of probability.</p>	<p>❖ The student participates with the class by predicting which color block will be pulled from the bag, conducts an experiment, and uses the information from the experiment to prove or disprove his/her prediction.</p> <p>Task Extension: The student realizes that after 20 pulls from the bag that red block is pulled 14 times, because there are more red blocks in the bag. The student supports their understanding of the results using the data from the experiment.</p>	<p>❖ The student can represent his/her work in a clear, organized manner.</p> <p>❖ Summary: The student states his/her final answer and uses appropriate math language and symbols to explain (verbally or in writing) how s/he predicted and proved what color the block would be when pulled from the bag.</p> <p>❖ Representations: The student can represent the colored blocks and has established an accurate system (charts/tables/graphs) to track the results of their experimental probability experiment.</p> <p>❖ Task Extension: The student includes a rule, equation, generalization, and/or observation (verbal or written) about their understanding of probability.</p>