ESTABLISHING PURPOSE

1 **What are the key content standards I will focus on in this lesson?**

Content Standards:

S-MD.B.7

Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.

2 **What are the learning intentions (the goal and *why* of learning, stated in student-friendly language) I will focus on in this lesson?**

Content: To apply our understanding of probability and statistical reasoning to make decisions.

Language: To explain how to make decisions using independent probability, conditional probability, and the rules of probability.

Social: To engage in productive discussions about how my peers made their decisions, including their reasoning and modeling of the scenario.

3 **When will I introduce and reinforce the learning intention(s) so that students understand it, see the relevance, connect it to previous learning, and can clearly communicate it themselves?**

The learning intentions will be introduced as learners enter the classroom and prepare for the day. I will also reinforce the learning intentions when students present their products and success criteria. This will allow me to make explicit connections between the learning intentions, success criteria, and student products.

SUCCESS CRITERIA

4 **What evidence shows that students have mastered the learning intention(s)? What criteria will I use?**

I can statements:

Learners will co-construct their success criteria based on the scenario they select. I will first ask them to make a decision about which of the scenarios they would like to tackle. I will walk the students through the development of their own personal success criteria and evidence necessary to show progress toward the success criteria. This is where each learner will describe the specific product or approach for his or her particular problem. Once the students and I agree on the success criteria, they will be released to tackle their problem-solving scenario.

5 **How will I check students' understanding (assess learning) during instruction and make accommodations?**

I will move around the room, asking specific questions and watching students work. At the same time, I will be checking for their understanding by observing students, asking questions, and interviewing them about their progress. I will constantly reflect on the learning in the classroom by asking where did learners struggle in the task and were there gaps in their learning that needed to be addressed at this point in the learning progression. I will provide feedback to all students as they apply their concepts and thinking to these problem-solving scenarios.

INSTRUCTION

6 **What activities and tasks will move students forward in their learning?**

I will distribute the choice boards to the students. Each of the choice boards has four of the following problem-solving scenarios:

1. *How do the dimensions of a baseball field affect batting statistics?*
2. *Is there such a thing as streakiness in baseball?*

3. How do combinatorial games work? What are several examples?
4. What are theoretical solutions and Monte Carlo simulations? What are several examples?
5. Determine if the Monty Hall theory is mathematically correct.
6. Prove the best strategy for playing hi-lo using probability.
7. Determine if it is reasonable in blackjack to act differently with a two-card 16 than with a three-card 16 against a dealer's 10. Alternatively, come up with your own blackjack scenario.
8. Test the probabilities of rolling certain combinations of dice in role-playing games.
9. Determine if the probability of picking the right object is better by switching your initial choice with a variant shell game, where one choice that is for sure wrong is removed by the person in charge and shown to you after you make your first guess.

7 What resources (materials and sentence frames) are needed?

1. Choice boards
2. Success criteria and evidence charts
3. Calculators
4. Manipulatives (e.g., deck of cards, dice, various objects for modeling)
5. Computer simulation software on Chromebooks

8 How will I organize and facilitate the learning? What questions will I ask? How will I initiate closure?

I will organize today's class into the following blocks of time:

1. Introduction of the learning intentions and tasks (whole-group)
2. Selection of the tasks from the choice boards (independent)
3. Development of the product and success criteria (conferencing with me)
4. Work toward the task and the gathering of evidence (independent)
5. Feedback and closure

Due to the independent nature of this task, learners will be responsible for organizing a portion of the day. For these specific chunks of time, they will have the option to work in the classroom or go to the library to secure additional resources or space to model the specific scenario. As learners complete the task, I will help them compile the evidence and their response to prepare for tomorrow's peer review.