UbD: Geometry - Probability

Time Frame: 11 Lessons	Unit 8: Conditional Probability	Course Name: Geometry

Stage 1: Desired Results

Established Goal(s)	Transferable Skills

Standards Addressed:

HSS-CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

HSS-CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

HSS-CP.A.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret the independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

HSS-CP.A.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

Students will be able to independently use their learning to…

- **understand and evaluate random processes underlying statistical experiments**
- **make inferences and justify conclusions from sample surveys, experiments and observational studies**
- **understand independence and conditional probability and use them to interpret data**
- **use the rules of probability to compute probabilities of compound events in a uniform probability mode**
- **calculate expected values and use them to solve problems**
- **use probability to evaluate outcomes of decisions**
- apply mathematical knowledge, skill, and reasoning to solve real-world problems.
- develop clear and effective communication.
- increase self-direction.
- develop creative and practical problem-solving.
- become responsible and involved citizens.
- develop informed and integrative thinking.

Meaning

Understandings
Students will understand that…

- math is a continuum, Algebra is needed for Geometry, and math concepts will build on themselves as we develop our mathematical understandings.
- chance experiments can not be solved absolutely. We can only look at the likelihood or probability that an event will occur given a certain sample space.
- knowledge of probability will allow students to be educated consumers of information in an uncertain world.
- there is independence and conditional probability and use them to interpret data.
- they can use the rules of probability to compute probabilities of compound events in a uniform probability model.

Essential Questions
- How can I use my knowledge of probability to make informed decisions about uncertain events?
- How can I collect and organize data to come to make reasonable predictions about real-life phenomena?

UbD: Geometry - Probability

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<tr>
<td rowspan="2">HSS-CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer

HSS-CP.B.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.

HSS-CP.B.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

HSS-ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.</td>
<td colspan="2">●   they can calculate expected values and use them to solve problems.</td>
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<td colspan="2" align="center">Acquisition</td>
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Students will know...
- it is possible to find or estimate probability using a model or data from a chance experiment.
- attributes of a chance experiment and how to identify one.
- how to find the sample space for chance experiments.
- how to model situations using probability.
- how to use sample space to calculate probability.
- how to create organized lists, tables, and tree diagrams and use them to calculate probabilities.
- how to use information in a two-way table to find relative frequencies and estimate probability.
- how to use tables and Venn diagrams to represent sample spaces and to find probabilities.
- how to use the addition rule to find probabilities.
- how to estimate probabilities, including conditional probabilities, from two-way tables.
- how to use probabilities and conditional probabilities to decide if events are independent.
- how to define and correctly use the glossary terms: chance experiment, event, outcome, probability, sample space, addition rule, dependent events, independent events, and conditional probability.
- the addition rule can be used to find probabilities.
- that tables and Venn diagrams can be used to represent sample spaces and find probabilities.
- how to find the sample space for chance experiments.

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Students will be able to...
- estimate probability using a model or data from a chance experiment.
- identify chance experiments.
- model situations using probability. I can use sample space to calculate probability.
- create organized lists, tables, and tree diagrams and use them to calculate probabilities.
- use information in a two-way table to find relative frequencies and estimate probability.
- estimate probabilities, including conditional probabilities, from two-way tables.
- estimate probabilities, including conditional probabilities, from two-way tables.
- define and use geometry-specific vocabulary words that were introduced in this unit.

Mathematical Practices:
- make sense of problems and persevere in solving them.
- reason abstractly and quantitatively.
- construct viable arguments and critique the reasoning of others.
- model with mathematics.
- use appropriate tools strategically.
- attend to precision.
- look for and make use of structure.
- look for and express regularity in repeated reasoning.

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<tr>
<td colspan="3" align="center">Stage 2: Evidence & Assessment</td>
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<tr>
<td align="center">Evaluative Criteria</td>
<td colspan="2" align="center">Assessment Evidence</td>
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