# Unit 3: Analyzing Patterns 

| Content Area: | Mathematics |
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| Course(s): | AP Statistics |
| Time Period: | Semester $\mathbf{2}$ |
| Length: | 10 weeks |
| Status: | Published |

## Standards

| MA.K-12.8 | Look for and express regularity in repeated reasoning. |
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| MA.S-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"). |
| MA.S-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. |
| MA.S-CP.A. 3 | Understand the conditional probability of $A$ given $B$ as $P(A$ and $B) / P(B)$, and interpret 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 $B$. |
| MA.S-CP.A. 5 | Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. |
| MA.S-CP.B. 6 | Find the conditional probability of $A$ given $B$ as the fraction of $B^{\prime}$ s outcomes that also belong to $A$, and interpret the answer in terms of the model. |
| MA.S-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. |
| MA.S-CP.B. 8 | Apply the general Multiplication Rule in a uniform probability model, $P(A$ and $B)=[P(A)]$ $\times[P(B \mid A)]=[P(B)] \times[P(A \mid B)]$, and interpret the answer in terms of the model. |
| MA.S-CP.B. 9 | Use permutations and combinations to compute probabilities of compound events and solve problems. |
| MA.S-MD.A | Calculate expected values and use them to solve problems |
| MA.S-MD.B | Use probability to evaluate outcomes of decisions |
| MA.S-MD.B.5b | Evaluate and compare strategies on the basis of expected values. |

## Enduring Understandings

Probability is used to make decisions.
Exploring random phenomena using probability and simulation helps to anticipate patterns in the world.

## Essential Questions

1. What are the chances of an event occuring?
2. When is a numerical outcome of a chance process a binomial random variable or a geometric random variable?
3. How do sampling distributions demonstrate patterns in sample proportions and sample means?

## Knowledge and Skills

- Calculate the probability of an event occuring.
- Find the probability of unions, intersections, and complements of two or more events occuring.
- Find the expected value of random variables.
- Determine if a random variable has a binomial setting or a geometric setting.
- Describe the shape, center, and spread of sampling distributions.


## Transfer Goals

Computers can assist in processing simulations.
It is hard to find something truly random.

## Resources

The Practice of Statistics, 4th edition by BFW
www.webassign.net
myap.collegeboard.org

