

# Unit 3: Analyzing Patterns

Content Area: **Mathematics**  
Course(s): **AP Statistics**  
Time Period: **Semester 2**  
Length: **10 weeks**  
Status: **Published**

## Standards

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MA.K-12.8	Look for and express regularity in repeated reasoning.
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 $P(A \text{ and } B)/P(B)$ , 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 $B$ '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, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ , and interpret the answer in terms of the model.
MA.S-CP.B.8	Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = [P(A)] \times [P(B A)] = [P(B)] \times [P(A B)]$ , 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

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Probability is used to make decisions.

Exploring random phenomena using probability and simulation helps to anticipate patterns in the world.

## Essential Questions

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1. What are the chances of an event occurring?

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**

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- Calculate the probability of an event occurring.
- Find the probability of unions, intersections, and complements of two or more events occurring.
- 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**

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Computers can assist in processing simulations.

It is hard to find something truly random.

### **Resources**

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The Practice of Statistics, 4th edition by BFW

[www.webassign.net](http://www.webassign.net)

[myap.collegeboard.org](http://myap.collegeboard.org)