Understand independence and conditional probability and use them to interpret data (Standards S.CP.1, 4–5).

**Standard II.S.CP.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”).

**Concepts and Skills to Master**

- Use correct set notation, with appropriate symbols and words, to identify sets and subsets within a sample space.
- Identify an event as a subset of a set of outcomes (a sample space).
- Draw Venn diagrams and two-way tables that show relationships (unions, intersections, or complements) between sets within a sample space.

**Related Standards: Current Course**

II.S.ID.5, II.S.CP.4, II.S.CP.5, II.S.CP.6, (IIH.S.CP.2, IIH.S.CP.3)

**Related Standards: Future Courses**

III.S.IC.6, AP Statistics

**Support for Teachers**

**Critical Background Knowledge**

- Represent sample spaces (7.SP.8)
- Construct and interpret frequencies and relative frequencies in a two-way table (8.SP.4)

**Academic Vocabulary**

sample space, subset, outcome, union, intersection, complement, \( \cup, \cap, \); \( A^c, A', -A \) (Note: Various notations are commonly used for complement.)

**Resources**

*Curriculum Resources:* [http://www.uen.org/core/core.do?courseNum=5620#71517](http://www.uen.org/core/core.do?courseNum=5620#71517)
Understand independence and conditional probability and use them to interpret data (Standards S.CP.1, 4–5).

**Standard II.S.CP.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. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.

**Concepts and Skills to Master**
- Construct and interpret two-way frequency tables, identifying the associations between categories.
- Recognize that the conditional probability, $P(A|B)$, represents the joint probability for $A$ and $B$ divided by the marginal probability of $B$. This association can be obtained from the two-way table.
- Given a two-way table, decide if events are independent based on conditional probability (if $A$ and $B$ are independent, then $P(A) = P(A|B)$).

**Related Standards: Current Course**
- II.S.ID.5, II.S.CP.5, II.S.CP.6, (IIH.S.CP.2, IIH.S.CP.3)

**Related Standards: Future Courses**
- III.S.IC.6, AP Statistics

**Support for Teachers**

**Critical Background Knowledge**
- Construct and interpret frequencies and relative frequencies in a two-way table (8.SP.4)
- Find probabilities of compound events from two way tables (7.SP.8)
- Calculate relative frequency (7.SP.6)

**Academic Vocabulary**
- conditional, independence, joint probability ($P(A \cap B)$), conditional probability ($P(A|B)$), marginal probability ($P(A)$ or $P(B)$)

**Resources**
- Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5620#71517
Understanding independence and conditional probability and use them to interpret data (Standards S.CP.1, 4–5).

**Standard S.CP.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.)

Concepts and Skills to Master
- Interpret conditional probabilities and independence and explain in context.

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<tr>
<th>Related Standards: Current Course</th>
<th>Related Standards: Future Courses</th>
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</thead>
<tbody>
<tr>
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<td>III.S.IC.6, AP Statistics</td>
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Support for Teachers

**Critical Background Knowledge**
- Summarize categorical data in a variety of ways. (II.S.ID.5)
- Find probabilities of events (7.SP.7)
- Understand and calculate conditional probabilities (II.S.CP.4)
- Understand independence. (II.S.CP.4)

**Academic Vocabulary**
- conditional probability, independence

**Resources**
- Curriculum Resources: [http://www.uen.org/core/core.do?courseNum=5620#71517](http://www.uen.org/core/core.do?courseNum=5620#71517)
Use the rules of probability to compute probabilities of compound events in a uniform probability model (Standard S.CP.6).

**Standard II.S.CP.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.

**Concepts and Skills to Master**

- Find and interpret conditional probabilities using different representations (such as a two-way table, Venn diagram, or tree diagram) and explain in context.

**Related Standards: Current Course**

- II.S.CP.1, II.S.CP.4, II.S.CP.6, (IIH.S.CP.2, IIH.S.CP.3)

**Related Standards: Future Courses**

- III.S.IC.6, AP Statistics

**Support for Teachers**

**Critical Background Knowledge**

- Summarize categorical data in two-way frequency tables. (II.S.ID.5)
- Understand and calculate conditional probabilities (II.S.CP.4)
- Find probabilities of events (7.SP.7)
- Design and use a simulation to generate frequencies for compound events (7.SP.8)

**Academic Vocabulary**

- random variable, probability model

**Resources**

- **Curriculum Resources:** [http://www.uen.org/core/core.do?courseNum=5620#71517](http://www.uen.org/core/core.do?courseNum=5620#71517)