When something random happens, we say that exactly one outcome occurs.

An event is a collection or a set of outcomes.

The sample space is the set of all outcomes. Denote the sample space using the letter S.

The empty set, denoted by $\emptyset$, is the event that contains no outcomes whatsoever.

If all of the outcomes in event A are also contained in event B, we say that A is a subset of B, denoted by $A \subset B$.

Set notation is handy for working with events. Set notation looks like

$$\{\text{the contents of the event} \mid \text{conditions on the event}\}$$

The union of events contains all outcomes that are in at least one of the events. The union is denoted by a cup symbol, $\cup$.

The intersection of events contains all outcomes that are in all the events. An intersection is denoted by a cap, $\cap$.

The complement of an event A is the event containing all outcomes not in A. The complement of A is denoted by A^c.

Events are pairwise disjoint if they have no overlaps. By an overlap, we mean an outcome that is found in a pair of the events.

Notice that event A and its complement A^c are disjoint, and their union is all of the sample space S. We could write $A \cup A^c = S$.