

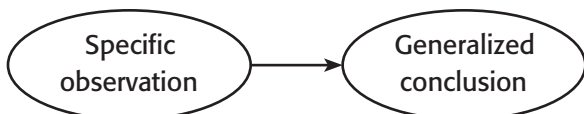
Section Overview

Inductive Reasoning

Lesson 2-1

Why? Scientists use inductive reasoning when they form hypotheses to test by experiment.

Inductive reasoning is used to make *conjectures* and continue patterns.



A generalized conclusion is a **conjecture**. To disprove a conjecture, you need only one **counterexample**.

By observing the triangles, you can make a conjecture about the pattern.



Conjecture: The color alternates between red and blue, and the triangle rotates 90° clockwise each time.

Based on the conjecture, the next triangle in the pattern is the following:



Conditionals and Deductive Reasoning

Lessons 2-2, 2-3

Why? Deductive reasoning is the basis for proof in mathematics. Lawyers use deductive reasoning when presenting cases in court.

Deductive reasoning is the process of using logic to draw conclusions.

A **conditional statement** is an if-then statement. It has a **hypothesis** and a **conclusion**.

If p , then q .
 $p \rightarrow q$

Conditional: $p \rightarrow q$
Converse: $q \rightarrow p$
Inverse: $\sim p \rightarrow \sim q$
Contrapositive: $\sim q \rightarrow \sim p$

Logically equivalent

Law of Detachment

If $p \rightarrow q$ is a true statement and p is true, then q is true.

Law of Syllogism

If $p \rightarrow q$ and $q \rightarrow r$ are true statements, then $p \rightarrow r$ is a true statement.

Biconditionals and Definitions

Lesson 2-4

Why? Definitions must be precise in order for people to communicate effectively.

A **biconditional statement** is an if-and-only-if statement.

p if and only if q .

$p \leftrightarrow q$

This means both $p \rightarrow q$ and $q \rightarrow p$.

Biconditionals are used to write precise **definitions**.